AP 2026-15

Optimal Disability Insurance

Employer and Worker Incentives

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Academic paper

Netspar

Optimal Disability Insurance: Employer and Worker Incentives*

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October 29, 2025

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Abstract

I develop a theoretical framework that determines the optimal design of disability insurance by explicitly incorporating employer behavior. Standard analyses balance insurance benefits against workers' labor supply incentives, but I account for a novel type of firm-side moral hazard: because employers do not bear the costs of workers' disability insurance, they may underprovide accommodation. This framework allows me not only to identify the optimal level of experience rating, a policy linking firms' disability insurance contributions to disability costs of their employees, but also to show how the standard optimal policy levels of DI eligibility and benefit generosity are altered when firm behavior is endogenized.

Keywords: Disability Insurance, Experience Rating, Employer Incentives, Work Accommodation

*I want to thank my supervisors Viola Angelini, Max Groneck and Raun van Ooijen for their support throughout this project. I also want to thank Jesús Bueren, Pierre Koning, Alexander Ludwig, Tianyu Ma, Wanda Mimra, Arthur van Soest, Adriaan Soetevent, Sándor Sóvágó and Gijsbert Zwart for valuable comments and discussions about this paper. Finally, I thank the participants at Ca'Foscari-Groningen PhD Exchange Seminar, EEF Micro Meeting, EUHEA, EUHEA PhD Conference, EUI Informal Seminar, LolaHESG, Netspar Pension Day, and at the SASCA PhD Conference.

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1 Introduction

One in six working-age individuals in the OECD reports having a disability, making disability insurance (DI) a major component of public spending (OECD, 2022). Demographic change is projected to further increase DI expenditures (Lorenzoni et al., 2019). In several OECD countries, DI inflow is already growing rapidly: in the Netherlands, for example, DI inflow rose by 60% between 2018 and 2024 (Berendsen et al., 2025). Designing optimal DI programs is therefore a crucial policy challenge. Standard social insurance theory shows that the optimal program balances a trade-off: a generous DI system reduces income risk for workers unable to work, but can also reduce work incentives for those with remaining work capacity. This balance, known as the insurance-incentive trade-off, determines the optimal design of DI (see e.g. Chetty and Finkelstein (2013); Chetty and Saez (2010) or Low and Pistaferri (2015)).

However, little is known about how employers affect optimal DI design. Employers can play a crucial role in retaining workers who have work disabilities with remaining capacity to work. As work disabilities are context-specific, employers can enable workers to use their remaining work capacity by offering work accommodations, such as altering the physical workplace through e.g. elevators or screen magnifiers, providing adjusted equipment, allowing flexible hours, or changing the job task description. Such accommodations have empirically been shown to increase continued employment (Burkhauser et al., 1995, 1999; Campolieti, 2005; Everhardt and de Jong, 2011; Hill et al., 2016; Van Ooijen et al., 2024). Yet, employers may provide less accommodation than is socially optimal, since they do not directly bear the DI costs of their employees. This may lead to firm-side moral hazard when accommodation efforts are not observed by the insurer (Hawkins and Simola, 2024; Prinz and Ravesteijn, 2020; OECD, 2008).

To address firm-side moral hazard, some governments have shifted part of disability risk and responsibility onto employers. The Netherlands represents an extreme case, with exceptionally strong employer responsibilities in its DI system. Typically, public DI premiums are at least partially financed by employer contributions, paid through uniform premiums that are the same across firms, regardless of the DI inflow of their employees. In the Netherlands, DI premiums are experience rated: firms whose employees generate higher-than-average DI costs face higher premiums, while those with lower costs pay less.[1] This directly ties DI costs to the employer and incentivizes accommodation to avoid DI entry. However, it also raises an important question: to what extent should disability risks be shifted to the firm? The key trade-off is that while experience rating may increase accommodation, it may also reduce firms' willingness to hire workers who are disabled or who are at higher risk of developing a disability, a process known as selective hiring. As a consequence, a full shift of disability costs to the firm might not be warranted.

In this paper, I develop a theoretical framework of optimal DI to determine the optimal level of experience rating, accounting for both worker and employer behavior. I extend the framework of Haller et al. (2024), based on the Diamond and Sheshinski (1995) model, by endogenizing employer behavior. The resulting employer-employee framework incorporates both the accommodation-hiring

[1] In addition to experience rating, Dutch employers are also responsible for up to two years of sick pay and face strong reintegration requirements before DI entry, placing unusually strong responsibilities on firms relative to other OECD countries (OECD, 2008).

and insurance-incentive trade-offs. Within this framework, I derive a Baily-Chetty-type formula for the optimal level of experience rating, which balances its central trade-off between improved accommodation and selective hiring.[2] I also show that the optimal levels of the standard DI policy parameters—eligibility and benefit generosity—are altered by incorporating employee behavior.

To model optimal DI design, I develop a sequential game with three types of players: the government, employers, and workers who are heterogeneous in disability. In the model, higher disability raises both disutility of work and productivity loss. Employers decide whether to hire a worker and, if so, whether to provide accommodation, which reduces disutility and productivity loss but is costly. Workers then decide whether to apply for DI and whether to leave the labor force if rejected. The government chooses three DI policy parameters: the level of experience rating, benefit generosity, and eligibility. Solving the model by backward induction yields several disability thresholds beyond which firms and workers change behavior. To characterize optimal DI design, I maximize a utilitarian social welfare function with respect to these policy parameters. This generates Baily–Chetty-type conditions for each of the policy parameters.

The analysis yields three key findings. First, I show how employee application and labor supply decisions interact with firms' accommodation and hiring choices. This identifies four disability thresholds that guide worker behavior, leading to five groups of workers with different behavior: *i*) below a first disability threshold, workers are too healthy to apply for DI; between this level and the next, workers apply only when not accommodated; *ii*) above a second threshold, workers always apply to DI but, if rejected, remain employed; *iii*) above a third threshold, workers apply to DI but only remain employed if accommodated; and *iv*) beyond a final threshold, workers always apply to DI and never remain employed when rejected. Moreover, I derive that employer behavior also depends on two disability thresholds: an accommodation threshold and hiring threshold. Employers only accommodate employees who respond to accommodation: that is, those who would otherwise apply for DI or leave employment after DI rejection. Firms accommodate the first group of workers up to a disability level where accommodation remains profitable, but at higher disability levels accommodation ceases. At even higher disability levels, hiring itself stops once expected profits turn negative due to experience rating. These thresholds illustrate how firm and worker decisions are jointly determined. The subsequent analysis shows how the policy parameters shift the thresholds between these groups and hence increases one group by decreasing another one.

Second, I establish how experience rating affects behavior and how its optimal level can be characterized. In the model, this implies that experience rating shifts the disability thresholds, changing the shares of workers in each of the groups. Increasing experience rating, which forces firms to internalize DI costs, has two effects: it lowers the accommodation threshold (increasing accommodation) but also lowers the hiring threshold (reducing hiring). The sufficient-statistics formula I derive weighs these opposing forces to identify the welfare-maximizing level of experience rating. Whether higher experience rating raises welfare is therefore theoretically ambiguous. I find

[2] The Baily-Chetty formula of optimal social insurance is a formula determining the optimal benefit level, that equates the consumption smoothing gains from increasing benefits to the behavioral response on labor force participation. This formula can be estimated empirically to determine the optimal level of experience rating in the sufficient-statistics framework, without having to estimate the full model (Baily, 1978; Chetty and Finkelstein, 2013).

that it improves welfare when the elasticity of accommodation with respect to experience rating is large and the elasticity of hiring is small, and when workers value accommodation strongly.

Third, I show that the standard DI policy parameters—DI eligibility and benefit generosity–depend on employer behavior. Endogenizing firms introduces new mechanisms. Stricter DI screening reduces the probability of DI receipt, lowering the expected cost of experience rating for firms. As a result, firms accommodate fewer workers but hire more. These two factors disappear in a worker-only framework, where stricter eligibility solely reduces DI applications through worker moral hazard. A similar logic applies to benefit generosity: cutting benefits makes DI less attractive for workers but also weakens the threat of experience rating for firms. In response, firms again hire more but accommodate fewer, raising applications. In contrast, a worker-side model would predict a decline in DI applications due to the decreased attractiveness of benefits to the worker. These results imply that even policy parameters formally targeted at workers indirectly shape employer behavior, and therefore their optimal levels cannot be set without accounting for firms. While it is theoretically ambiguous whether eligibility and benefits should optimally be stricter once firm behavior is endogenized, I show which elasticities (accommodation, hiring, and DI receipt) enter the new optimality conditions.

This paper makes three key contributions. First, I endogenize employer behavior in the sufficient-statistics framework of DI (the Haller et al. (2024) framework), showing how firm accommodation and hiring interact with worker application and labor supply. Aizawa et al. (2025) also model worker and firm behavior in a quantitative structural model of DI. However, they focus on screening at hiring and does not include accommodation, endogenous DI application decisions, or experience rating. Second, I analytically determine the socially optimal level of experience rating when both employer and employee behavior are considered. The model of Prinz and Ravesteijn (2020) is the only study that also derives an optimality condition for experience rating, yet they only capture firm responses. They do not include accommodation and model retention as a binary choice of the firm, while in fact, the worker's response to accommodation determines whether a worker remains employed. Thus, both sides are essential to the analysis. Finally, I show that the two standard employee-side policy parameters in the Haller et al. (2024) framework—eligibility rules and benefit levels—are also affected by firm responses. This demonstrates that optimal DI policy cannot be designed solely from the worker side: employer behavior systematically shifts the optimal levels of these parameters.

The main policy implication of this study is that optimal DI design must consider both insurance-incentive trade-offs and employer-side effects. Countries seeking to limit firm-side moral hazard and increase accommodation could employ employer incentives, such as experience rating, but must weigh potential selective hiring against the accommodation effect. Even in systems without explicit employer incentives, worker-side policy parameters trigger firm responses, so reforms should account for both types of agents.

The rest of this paper is organized as follows. Section 2 reviews related literature. Section 3 introduces the main model, which is analyzed and solved in Section 4, where I also derive the optimality conditions for experience rating, benefit generosity, and eligibility criteria. Section 5 contrasts the main model to an economy without experience rating and examines its welfare implications. Section 6 discusses model assumptions and alternative versions, and Section 7 concludes.

2 Literature

This paper fits within the theoretical literature on social insurance by studying how employer behavior and incentives shape optimal DI design. There are two broad strands in the theoretical literature: the sufficient-statistics approach, relying on Baily-Chetty-type formulas that can be estimated to assess the optimality of policy parameters, and the structural modelling approach: where often lifecycle models are employed that have to be fully calibrated to estimate optimal policy, and can also be used for policy counterfactual simulation. The sufficient-statistics approach, first developed by Baily (1978) and Chetty (2006) in the context of unemployment insurance (UI), uses a few empirically estimable statistics to determine the optimal level of benefits, balancing the consumption-smoothing benefits of insurance against moral hazard (labor supply reduction) costs, using the so-called Baily-Chetty formula. Since then, various other papers have used and extended this framework for optimal UI policy (see e.g. Gruber (1997); Kolsrud et al. (2018); Landais et al. (2018); Landais and Spinnewijn (2021); Schmieder et al. (2016)). A small strand also endogenizes employer screening and hiring behavior for UI, for instance Lehr (2017) and Meier and Obermeier (2025).

A much smaller fraction applies the sufficient-statistics framework to DI. Meyer and Mok (2019) use it to assess the welfare-maximizing level of DI in the US, while Deshpande and Lockwood (2022) estimate only a part of the Baily-Chetty formula: the insurance value of DI in the US. More recently, Haller et al. (2024) employ the Diamond and Sheshinski (1995) model to analyze the welfare effects for two employee-side policy parameters, eligibility rules and benefit generosity, in Austria.

Yet, the sufficient-statistics literature solely focuses on worker behavior and does not include the employer. Therefore, employer incentives such as experience rating cannot be evaluated. Prinz and Ravesteijn (2020) provide the only model capturing the optimal level of experience rating, but only include firm responses and not those of the worker. They argue that experience rating causes a selection and retention effect, i.e. a binary choice of the firm to retain a worker after a health shock. For optimal experience rating, they argue that these two effects should be traded off against each other.

Optimal DI is also considered in structural models. These models usually consider the trade-off between insurance and the labor supply disincentives, focusing solely on worker behavior (Ball and Low, 2014; Britton and French, 2020; Low and Pistaferri, 2015). Aizawa et al. (2025) provide the first structural equilibrium search model on DI that combines worker and firm behavior. Firms offer contracts with non-wage benefits to screen out disabled workers. While these non-wage benefits could be interpreted as a form of accommodation, the model only captures screening at hiring and not the effects of accommodation on DI application or worker retention.

My paper also uses insights from the mostly empirical literature on experience rating, which generally finds positive, although sometimes insignificant, effects on DI inflow or sustained employment (see e.g. Koning (2009); Van Sonsbeek and Gradus (2013); De Groot and Koning (2016); Koning et al. (2025); Hawkins and Simola (2024); Kyyrä and Tuomala (2023)). Yet, limited evidence exists on the mechanisms behind these effects—accommodation and selective hiring. Jansen et al. (2025) find no significant effect of experience rating on the accommodation rates of long-term sick-listed workers in the Netherlands, while Hawkins and Simola (2024) estimate that experience rating shifts new hires away from higher-risk workers in Finland. Prinz and Ravesteijn (2020) also document selective hiring in the Netherlands as a result of experience rating.

I build on these strands of the literature by combining employer and employee behavior into one framework of DI, where I can simultaneously consider worker- and firm-side policy parameters. Since hiring, accommodation, and employee responses to accommodation are explicitly modeled, I am able to also evaluate the effects of experience rating, which is not possible in models abstracting from these factors.

3 Model set-up

To determine the socially optimal level of experience rating while connecting both firm and worker behavior, I develop a sequential game that extends the Diamond and Sheshinski (1995) model with a firm side. Key features of the model are workers that are heterogeneous in their disability level who can be hired by the firm. Firms can provide accommodation which reduces the productivity loss and disutility caused by disability. If a hired worker successfully applies for DI, the worker has to pay an experience rating fee. Compared to the Diamond and Sheshinski (1995) model, the firm side is novel, as are its implications to the worker and government: accommodation and hiring are newly added (in the original model, no one is accommodated and everyone is already hired), and the government can employ an additional policy instrument, experience rating. Besides this, the government and worker side are modeled after Diamond and Sheshinski (1995) and Haller et al. (2024).

3.1 Model environment, timing, and choices

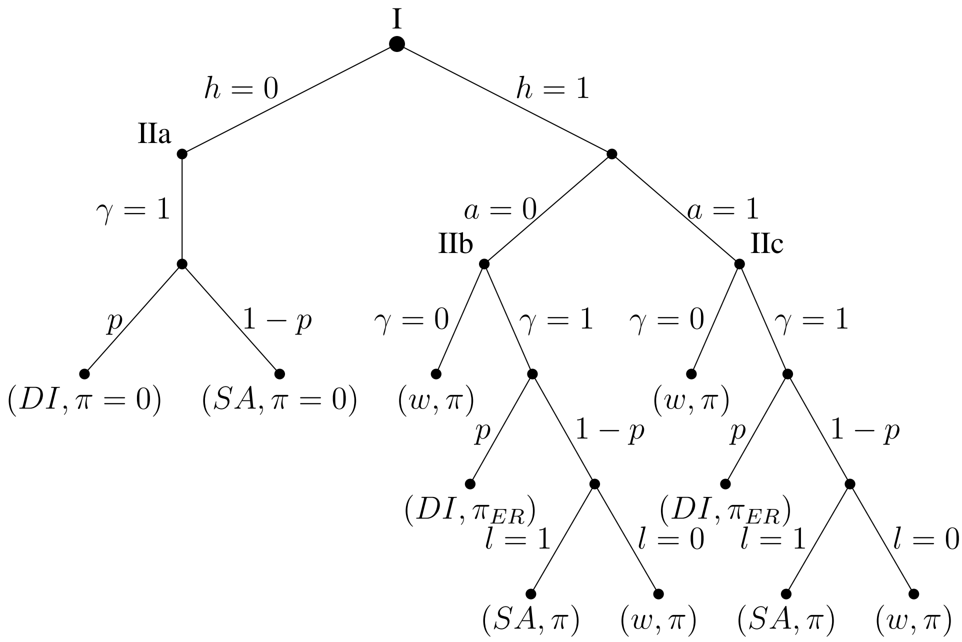
I model a sequential game with three types of players: the government, identical firms, and heterogeneous workers. Workers are ex-ante heterogeneous in their disability type $\theta \in [0, \bar{\theta}]$ which is drawn randomly from a continuous distribution $F(\theta)$. The economy consists of a continuum of workers and the same number of identical firms that are randomly matched.

The timing and choices of the model are depicted in Figure 1. First, the government decides on the DI policy parameters: the level of experience rating η, the level of DI benefits b and the DI eligibility threshold θ^e. The government also determines the level of social assistance s. Next, the firm decides whether to hire ($h \in \{0, 1\}$) the worker matched to them, and if hired, whether to accommodate ($a \in \{0, 1\}$) the worker. Finally, the worker observes the choices of the employer. The worker chooses whether to apply for DI ($\gamma \in \{0, 1\}$), which is granted with probability $p(\theta)$, with $p'(\theta) > 0$. When a DI application is rejected, the worker decides whether to keep working ($l = 0$) or to leave and collect social assistance ($l = 1$).

3.2 Workers

Workers are risk-averse and optimize utility, while being heterogeneous in their disability level $\theta \in [0, \bar{\theta}]$. The disability level doubles as labor disutility that applies only to employed workers. A worker can be in three states. The first state is employment, with utility $u(w - \tau) - \theta + \mathbb{1}_a v$, where

Figure 1: *Game tree of employer and employee decisions*



Notes: The game starts at point I, where the firm observes the disability level of the matched worker. The firm then decides whether to hire the worker (h). Conditional on hiring, it chooses whether to accommodate (a). At one of points IIa, IIb, or IIc, the worker's decisions stage begins. The workers chooses whether to apply for DI (γ). Applications are granted with probability p; if rejected, the worker either remains employed or exits the labor force (l).

w denotes the fixed wage, τ the income tax, and θ the labor disutility or disability. $\mathbb{1}_a$ is an indicator function that equals one when the firm provides accommodation and zero otherwise, and v is the utility stemming from accommodation, which is the same for all workers. This means that disability reduces total utility from work, but accommodation can improve utility from work. The second state is receiving DI benefits, with utility $u(b)$, where b denotes the fixed DI benefit. The final state is receiving social assistance, also fixed for all workers, denoted by s, with utility $u(s)$. I assume that $w - \tau > b > s$.

Workers enter the game when the government already set the DI policy parameters (experience rating η, DI benefits b, DI eligibility threshold θ^e) and the level of social assistance s, and know whether they have been hired and whether they receive accommodation by the firm. I consider hired workers and non-hired workers separately, as the optimization problem for hired workers is different from that of non-hired workers.

If a worker is hired, their first choice is whether to apply to DI ($\gamma \in \{0, 1\}$). The worker optimally chooses γ by comparing the expected utility of DI application, which yields DI benefits $u(b)$ with probability $p(\theta)$ and utility from work $u(w - \tau) - \theta + \mathbb{1}_a v$ with probability $1 - p(\theta)$, against the utility of remaining employed, yielding $u(w - \tau) - \theta + \mathbb{1}_a v$. Their first optimization problem is therefore:

$$\max_{\gamma \in \{0,1\}} \gamma \left[p(\theta)u(b) + (1 - p(\theta)) \left[u(w - \tau) - \theta + \mathbb{1}_a v\right]\right] + (1 - \gamma) \left[u(w - \tau) - \theta + \mathbb{1}_a v\right]. \quad (1)$$

If a worker is rejected for DI, their second choice is to stay employed ($l = 0$), with utility $u(s)$ or to withdraw and collect social insurance ($l = 1$) with utility $u(w - \tau) - \theta + \mathbb{1}_a v$. So, the worker optimally chooses $l \in \{0,1\}$ to maximize:

$$\max_{l\in\{0,1\}} lu(s)] + (1-l)\left[u(w-\tau) - \theta + \mathbb{1}_a v\right]. \tag{2}$$

If a worker is not hired, they always apply to DI since $u(b) > u(s)$, with expected utility $p(\theta)u(b) + (1-p(\theta))u(s)$.

3.3 Firms

Risk-neutral identical firms maximize expected profits and are randomly matched to one worker, of whom they observe the disability level.[3] When the firm hired a worker, fixed revenues S are earned and the firm pays the fixed wage w. Disability of the worker reduces revenues by a fraction ϕ, i.e., disability leads to a productivity loss. The firm can reduce this productivity loss by accommodating, which increases productivity by χ, again equal for all firms, at cost e. I assume that χ does not cover all disability, reflecting the fact that accommodation could not realistically cover all health issues. Thus, I assume:

Assumption 1 *Accommodation does not fully offset the largest productivity loss of disability.*

$$\chi < \phi\bar{\theta}.$$

Moreover, I assume that the cost of accommodation e is larger than its immediate gain χ.

Assumption 2 *The productivity gain of accommodation is smaller than its cost.*

$$\chi - e < 0.$$

When the firm does not hire the worker, profits are zero. When the firm employs the matched workers, profits are $\pi = S - w - \phi\theta + \mathbb{1}_a[\chi - e]$, depending on whether the firm provides accommodation. Moreover, if a worker who received accommodation leaves, the firm can recover the accommodation costs e. When a hired worker successfully applies for DI, the firm earns no revenue but must pay an experience rating fee, η, which covers part of the government DI expenditures. Thus, when the worker applies to DI ($\gamma = 1$), expected firm profits are $-\eta$ with probability $p(\theta)$ and with probability $1 - p(\theta)$, either $S - w - \phi\theta + \mathbb{1}_a v)$ if the worker stays at the firm ($l = 0$) or zero if the worker leaves and collects social assistance. If the worker does not apply to DI ($\gamma = 0$), profits are $S - w - \phi\theta + \mathbb{1}_a v$. Therefore, the optimization problem of the firm is given by:

$$\max_{h\in\{0,1\}, a\in\{0,1\}} hE(\pi) \tag{3}$$

[3] The firm being able to observe the disability level of the worker appears to be a strong assumption. However, empirical evidence shows that selective hiring as a result of experience rating does take place. Prinz and Ravesteijn (2020) find that after experience rating, newly hired workers are 4.2% less likely to be in the top quartile and 3% less likely to be in the top decile of predicted DI receipt. Hawkins and Simola (2024) shows experience rating shifts hiring away from higher-disability-risk groups based on observable characteristics. Hence, firms appear able to form accurate expectations of a worker's future DI receipt based on observable characteristics. In the model, allowing firms to observe disability with error (like the government) would place firm thresholds on a different scale than worker thresholds, preventing closed-form derivations of the optimality conditions. The intuition, however, would remain, but the firm's expectations of the worker's decisions would no longer exactly coincide with the actual worker decisions, since the disability level of the worker and the observed disability level by the firm are different.

with

$$E(\pi) = \gamma\left[-p(\theta)\eta + (1-p(\theta))\left[(1-l)(S - w - \phi\theta + \mathbb{1}_a(\chi - e))\right]\right] \\ + (1-\gamma)\left[S - w - \phi\theta + \mathbb{1}_a(\chi - e)\right].$$

Moreover, I assume that firm profits remain positive in the absence of experience rating. Hence, even with the highest disability level, firm profits are positive when the worker is employed: $S - w - \phi\bar{\theta} + \chi - e \geq 0$. This assumption will restrict any non-hiring decisions to be caused by experience rating only.

Assumption 3 *Profits are non-negative when the worker is employed.*

$$S - w - \phi\bar{\theta} + \chi - e \geq 0.$$

Combining these decisions, Table 1 summarizes the final payoffs of the worker and the firm.

Table 1: *Employer and employee payoffs*

Hire	Apply	DI awarded	Leave firm	Employee utility	Employer profit
$h = 0$	$\gamma = 1$	Yes with $p(\theta)$		$u(b)$	0
		No with $1 - p(\theta$		$u(s)$	0
$h = 1$	$\gamma = 0$			$u(w - \tau) - \theta + \mathbb{1}_a v$	$S - w - \phi\theta + \mathbb{1}_a[\chi - e]$
$h = 1$	$\gamma = 1$	Yes with $p(\theta)$		$u(b)$	$-\eta$
		No with $1 - p(\theta)$	$l = 0$	$u(w - \tau) - \theta + \mathbb{1}_a v$	$S - w - \phi\theta + \mathbb{1}_a[\chi - e]$
			$l = 1$	$u(s)$	0

3.4 Government and DI system with experience rating

The government maximizes social welfare subject to a government budget constraint. The government sets the level of experience rating η, the DI benefit level b, and the DI eligibility threshold θ^e. The government cannot perfectly observe the worker's type θ, instead it observes a noisy signal $\tilde{\theta} = \theta + e(\theta)$, in which $e(\theta)$ is the noise. When $\tilde{\theta}$ surpasses the eligibility threshold θ^e that is set by the government, DI applications are accepted. If $\tilde{\theta} < \theta^e$, applications will be rejected. Hence, $p(\theta)$ can be specified as $p(\theta, \theta^e)$ with $\partial p(\theta; \theta^e)/\partial\theta \geq 0$ and $\partial p(\theta; \theta^e)/\partial\theta^e \leq 0$.

Taking into account the optimal behavior of the employers and employees, the government optimizes social welfare consisting of aggregate worker utility (equally weighted) $V_w(\eta, b, \theta^e)$ subject to the government budget constraint ($G(\eta, b, \theta^e \geq \bar{G})$).[4] The government budget deficit is constraint by a maximum deficit: $\bar{G}$. Government income consists of labor tax income and the experience rating fee from the firms whose hired employer leaves to DI. Government expenditures consist of DI benefits and social assistance. The government optimization problem is given by:

$$\max_{\eta, b, \theta^e} V_w(\eta, b, \theta^e), \tag{4}$$

subject to the government budget constraint:

$$G(\eta, b, \theta^e) = \tau L + \eta ER - bDI - sSA \geq -\bar{G},$$

[4] In Section 6 I show the government solution when the social welfare function also includes firm profits.

in which L denotes the mass of people employed, ER the number of firms paying the experience rating fee, DI the mass of DI recipients, and SA the mass of social assistance recipients.

4 Model solution

The model is solved by backward induction I first derive the worker's best responses, then those of the worker, and finally the government's optimal policy choices on experience rating, DI eligibility, and benefit generosity, which determine the socially optimal DI parameters.

4.1 Workers's best responses

Workers enter the game at points IIa, IIb, or IIc of the game tree (Figure 1), knowing whether they were hired, ($h \in \{0, 1\}$) and whether they are accommodated ($a \in \{0, 1\}$), if hired. The worker then decides whether to apply to DI ($\gamma \in \{0, 1\}$) (*Optimization problem* 1), and if rejected for DI, whether to leave the firm ($l \in \{0, 1\}$) (*Optimization problem* 2).

Following a backward induction strategy, the labor supply decision l is solved first. This decision only occurs in the scenario where a worker was hired but unsuccessfully applied to DI. A worker with disability level θ^l is indifferent between working ($l = 0$) or collecting social assistance ($l = 1$) when the two utilities are the same:

$$u(w - \tau) + \mathbb{1}_a v - \theta^l = u(s),$$

which defines the disability level of the marginal social assistance recipient, θ^l:

$$\theta^l = u(w - \tau) + \mathbb{1}_a v - u(s).$$

When $\theta \geq \theta^l$, a worker prefers collecting social assistance over working, and the reverse for $\theta < \theta^l$.

The next decision, (or in chronological order, the previous decision) is whether to apply to DI. This decision must be made both by workers that were hired and workers that were not hired. Yet, since I assume that DI benefits are more generous than social assistance ($b > s$), all non-hired individuals will apply to DI, so I disregard the option that they do not apply:

Proposition 1 *When $h = 0$, the worker's best application response is $\gamma = 1$.*

A worker with disability level θ^γ is indifferent between applying or not when the utility of working equals the expected utility of applying:

$$u(w - \tau) + \mathbb{1}_a v - \theta^\gamma = p(\theta)u(b) + (1 - p(\theta))(u(w - \tau) + \mathbb{1}_a v - \theta^\gamma)$$

which defines the disability level of the marginal applicant, θ^γ:

$$\theta^\gamma = u(w - \tau) + \mathbb{1}_a v - u(b).$$

Thus, a worker with $\theta \geq \theta^\gamma$ applies to DI, whereas workers with $\theta < \theta^\gamma$ do not.

To summarize, optimal employee behavior depends on two thresholds: workers with disability higher than θ^γ apply to DI, while workers with even higher disability levels, $\theta > \theta^l$ would not return to the firm when rejected for DI. Yet, employee behavior can be decomposed even further, as the current thresholds still depend on the accommodation choice of the firm. I derive the following Proposition.

Proposition 2 *Let $\theta^1, \theta^2, \theta^3, \theta^4$ be defined as*

$$\theta^1 = u(w-\tau) - u(b), \theta^2 = u(w-\tau) - u(b) + v,$$

$$\theta^3 = u(w-\tau) - u(s), \theta^4 = u(w-\tau) - u(s) + v.$$

The best responses of a hired worker with disability θ are given by:
DI application $\gamma(\theta)$:

$$\gamma(\theta) = \begin{cases} 0 & \textit{if } 0 \leq \theta < \theta^1 \quad \textit{(never-appliers)}, \\ 1 - \mathbb{1}_a & \textit{if } \theta^1 \leq \theta < \theta^2 \quad \textit{(application compliers)}, \\ 1 & \textit{if } \theta^2 \leq \theta \leq \theta^3 \quad \textit{(always-appliers)}. \end{cases}$$

Leave the firm if DI application rejected $l(\theta)$:

$$l(\theta) = \begin{cases} 0 & \textit{if } 0 \leq \theta < \theta^3 \quad \textit{(always-suppliers)}, \\ 1 - \mathbb{1}_a & \textit{if } \theta^3 \leq \theta < \theta^4 \quad \textit{(labor compliers)}, \\ 1 & \textit{if } \theta^4 \leq \theta \leq \bar{\theta} \quad \textit{(never-suppliers)}. \end{cases}$$

Table 2 summarizes the best responses of hired workers. Workers with disability $0 \leq \theta < \theta^1$ do not apply to DI, regardless of accommodation, since their disutility from work is so minor that it does not weigh against the lower income of DI benefits, even without accommodation. Workers with disability $\theta^1 \leq \theta < \theta^2$ are compliers with respect to DI application: when accommodated, they do not apply to DI, when they are not accommodated, they do apply. If the disability is even higher, $\theta^2 \leq \theta < \theta^3$, individuals always apply for DI and stay employed when the application is rejected. Workers with disability $\theta^3 \leq \theta < \theta^4$ are compliers with respect to labor supply: when rejected for DI, they would stay only at the firm when accommodated. Individuals with the highest disability level, $\theta^4 \leq \theta \leq \bar{\theta}$ always apply and would not stay employed, regardless of accommodation.

The relative sizes of the thresholds are established by Lemma 1 and Assumption 4:

Lemma 1 *Since $v > 0$, it holds that $0 < \theta^1 < \theta^2$ and that $\theta^3 < \theta^4 < \bar{\theta}$. Yet, $\theta^2 = u(w - \tau) - u(b) + v$ is not necessarily smaller than $\theta^3 = u(w-\tau) - u(s)$. Under Assumption 4 ($v < u(b) - u(s)$), $\theta^2 < \theta^3$.*

Assumption 4 *The utility difference between receiving DI benefits and receiving social assistance is larger than the utility gain from accommodation when working.*

$$0 < v < u(b) - u(s).$$

Table 2: *Optimal employee behavior for each disability level*

Disability	Description	Application	Labor supply
$[0; \theta^1]$	Never-appliers	$\gamma = 1$	$l = 0$
$[\theta^1; \theta^2]$	Compliers w.r.t. application	$\gamma = 1$ or $\gamma = 0^*$	$l = 0$ (if applied and rejected for DI)
$[\theta^2; \theta^3]$	Always-appliers	$\gamma = 1$	$l = 0$ (if rejected for DI)
$[\theta^3; \theta^4]$	Compliers w.r.t. labor supply	$\gamma = 1$	$l = 1$ or $l = 0^*$ (if rejected for DI)
$[\theta^4; \bar{\theta}]$	Never-suppliers	$\gamma = 1$	$l = 1$ (if rejected for DI)

*conditional on whether accommodation is provided by the firm or not

4.2 Firms' best responses

Firms optimize expected profits conditional on employee's best responses, which they can perfectly predict as they observe the disability level. Following the same structure, I start with the last decision of the employer: conditional on having hired ($h = 1$), should the firm accommodate the worker or not ($a = 1$ or $a = 0$)? If the firm did not hire the worker ($h = 0$), no accommodation choice has to be made.

Accommodation. For the firm to invest in accommodation, expected profits when accommodation is provided must be larger than when accommodation is not provided. Hence, to deduct the best accommodation responses, I compare $\pi_{a=1} - \pi_{a=0}$ for each disability type of the worker, conditional on the firm employing a worker. Only if the profit difference is positive, the firm will accommodate. From the employee perspective, utility is maximized when accommodation is provided. Yet, the firm does not take worker utility directly into account, nor the effect of not-accommodating on the government budget constraint. Therefore, accommodation will be inefficiently low: this can be seen as employer moral hazard. The employer optimization problem regarding accommodation can be described by *Optimization problem* 3, subject to the employer's best responses (Proposition 2). In Appendix A.1, I derive Proposition 3:

Proposition 3 *Conditional on hiring the worker, the firm's optimal accommodation decision a for each of the worker's types is:*

***Never-appliers** ($0 \leq \theta < \theta^1$):*	$a = 0$
***Application compliers** ($\theta^1 \leq \theta < \theta^2$):*	*If ϕ is large: $a = 1$ for $0 \leq \theta \leq \theta^*$, otherwise $a = 0$* *If ϕ is small: $a = 0$ for $\theta \leq \theta^*$, otherwise $a = 1$*
***Always-appliers / always-suppliers** ($\theta^2 \leq \theta < \theta^3$):*	$a = 0$
***Labor compliers** ($\theta^3 \leq \theta < \theta^4$):*	$a = 1$
***Never-suppliers** ($\theta^4 \leq \theta \leq \bar{\theta}$):*	$a = 0$

Here, a large ϕ means $\phi > \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta+p(\theta)}$, and small ϕ means $\phi < \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta+p(\theta)}$.

Proof 1 *See Appendix A.1.*

In the following, I make two assumptions which I relax in Section 6.

Assumption 5 *The productivity loss caused by disability ϕ is assumed to be relatively large.*

$$\phi > \frac{p'(\theta)(S - w + \eta)}{p'(\theta)\theta + p(\theta)}.$$

The implication of this assumption is that accommodation will be provided up to the threshold value for compliers with respect to accommodation, θ^*. Moreover, I assume

Assumption 6 *The employer threshold θ^* lies strictly within the employee thresholds that it is based on.*

$$\theta^1 < \theta^* < \theta^2.$$

Proposition 3 can be understood as follows. The workers whose application or labor supply behavior cannot be affected by the firm will not be accommodated, while a fraction of the workers whose behavior can be affected by the employer, the compliers, will be accommodated. Workers who are not compliers will not be accommodated because the direct gain of accommodation of firms is negative, due to Assumption 2 which says that the cost of accommodation e is larger than the productivity gain χ.

For compliers, however, accommodation does not only lead to a direct productivity gain but also to a behavioral response of the worker. Regarding compliers with respect to application, accommodation prevents DI application, causing the firm to earn $S - w - \phi\theta + \chi - e$. Because of Assumption 3, this is always positive. If, however, the firm does not accommodate, the worker will apply to DI. With probability $1 - p(\theta)$, the firm earns $S - w - \phi\theta$, but with probability $p(\theta)$, the worker receives DI and the firm has no revenues, while having to pay the experience rating fee η. These expected profits can both be negative and positive because of the experience rating fee. In Appendix A.1, I derive that with a relatively large ϕ, namely $\phi > \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta+p(\theta)}$, $\pi_{a=1} > \pi_{a=0}$ for values of θ lower than $\theta^* = \frac{\chi-e}{p(\theta^*)\phi} + \frac{S-w+\eta}{\phi}$. Intuitively, a higher disability level θ reduces both $\pi_{a=1}$ and $\pi_{a=0}$. θ reduces expected profits of $\pi_{a=1}$ only through the productivity loss ϕ whereas it reduces $\pi_{a=0}$ through multiple channels. When, however, ϕ is relatively large, disability has a more severe impact on $\pi_{a=1}$ than on $\pi_{a=0}$, meaning that workers will be accommodated up to θ^* but not beyond that.

Finally, compliers with respect to labor supply will all be accommodated. These workers all apply to DI, and by accommodating them, the firm can prevent the worker from leaving when the DI application was rejected which increases profits from zero to $S - w - \phi\theta + \chi - e > 0$.

Optimal hiring. The final step in the backward induction order is the first decision of the firm: the hiring decision. The firm knows its optimal accommodation choice upon hiring, and can hence compare the expected profits of hiring under its optimal accommodation decision ($\pi_{h=1}$) to the profits of not-hiring, which will always be zero ($\pi_{h=0} = 0$). If $\pi_{h=1} - \pi_{h=0} > 0$, which is equivalent to saying that $\pi_{h=1} > 0$, the firm will hire the worker. Thus, only when expected profits under the optimal firm accommodation choice are positive, the firm hires. In Appendix A.2 I derive that optimal hiring can be described by Proposition 4.

Proposition 4 *Define the hiring threshold θ^h as the disability level at which expected profits under the firm's optimal accommodation turn negative. Expected profits can become negative only in $[\theta^*, \theta^3]$ or $[\theta^3, \theta^4]$.*

Then,

$$\theta^h = \begin{cases} \frac{S-w}{\phi} - \frac{p(\theta^h)\eta}{(1-p(\theta^h))\phi}, & \textit{low profitability: } \theta^h \in [\theta^*, \theta^3], \\ \frac{S-w+\chi-e}{\phi} - \frac{p(\theta^h)\eta}{(1-p(\theta^h))\phi}, & \textit{high profitability: } \theta^h \in [\theta^3, \theta^4]. \end{cases}$$

For $\theta > \theta^h$, the firm does not hire the worker.

Proof 2 *See Appendix A.2*

Proposition 4 can be interpreted as follows. With relatively low disability levels, workers either do not apply to DI ($\theta \in [0, \theta^1]$) because they are never-appliers or accommodated compliers with respect to application, meaning that expected profits are positive since there is no risk of experience rating. Yet, from disability level θ^* on, which is when firms do not accommodate these compliers anymore, workers all apply to DI, which therefore creates an experience rating risk for firms: when a worker obtains DI, firms have no income but have to pay the experience rating fee η. At an even higher level, from θ^4 on, workers do not return to the firm when rejected for DI, so expected profits are negative with certainty: profits are either 0 or $-\eta$. In between these values, θ^* and θ^4, expected profits must turn negative at some disability level, depending on the parameterization of the model. At that disability level, firms no longer hire workers.

In the main text, I carry out my analyses under the assumption that the economy is a low profitability economy. This implies that workers are no longer hired at disabilituy level $\theta^h \equiv \frac{S-w}{\phi} - \frac{p(\theta^h)\eta}{(1-p(\theta^h))\phi}$, which lies in between θ^* and θ^3. In Section 6 I relax this assumption.

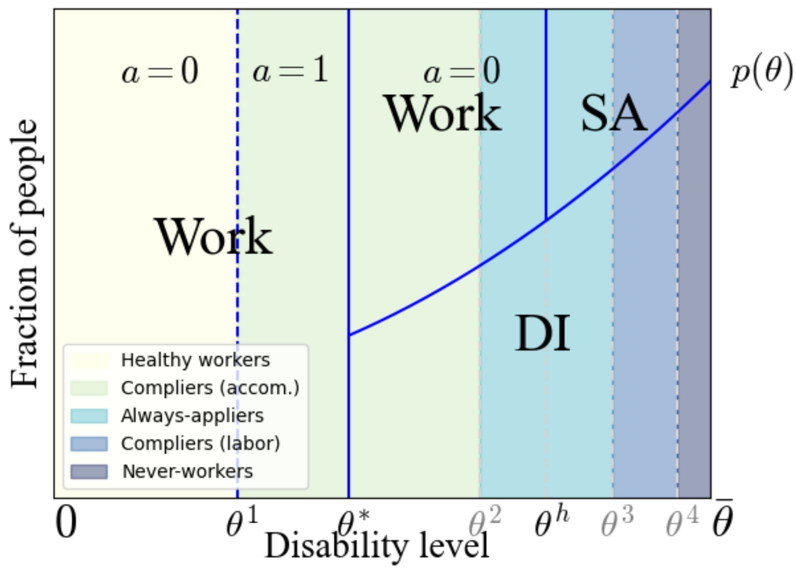
Combined optimal responses of firms and workers. Figure 2 displays the best responses of both firms and workers, which together describe the economy. Relatively healthy workers (never-appliers) are not accommodated but do not apply to DI. Compliers with respect to application are accommodated up to disability level θ^*, beyond which workers are no longer accommodated and therefore apply to DI. A fraction $p(\theta)$ of them is successful and claims DI benefits b, in which case the employer has to pay the experience rating fee η. Always-appliers are also not accommodated, since firms cannot change their behavior and the direct net gain of accommodation is negative for firms, since the cost of accommodation e is larger than its productivity gain χ. From disability level θ^h on, expected profits from hiring turn negative, meaning that the firm will not hire anymore. These workers either obtain DI or have to resort to social assistance.

4.3 Government solution: optimal policy parameters

The government maximizes social welfare following a utilitarian social welfare function, meaning that the government equally sums all workers' utilities. The government chooses the level of the experience rating fee η, the DI benefit level b, and the eligibility threshold θ^e, while taking the firm and worker's best responses and the government's own budget constraint into account . As explained before, I consider government problem in the case of low profitability ($\theta^* < \theta^h < \theta^3$). In Appendix B.1, I solve the other scenarios, which all result in effectively the same optimality conditions.[5] The

[5]In Appendix B.1, I consider the cases when θ^* is outside of the θ^1 and θ^2 bounds. When $\theta^1 > \theta^*$, θ^1 becomes the effective bound. This means that the outcomes are governed by a threshold that comes from the employee optimization problem (θ^1, the threshold beyond which

Figure 2: *Firms' and workers' best responses*



government's Lagrangian is the following:

$$\max_{\eta,b,\theta^e} \mathcal{L}(\eta, b, \theta^e) = V_w(\eta, b, \theta^e) + \lambda(G(\eta, b, \theta^e) - \bar{G})$$

$$s.t.$$

$$\theta^1 = u(w-\tau) - u(b), \theta^* = \frac{\chi - e}{p(\theta)\phi} + \frac{S - w + \eta}{\phi},$$

$$\theta^h = \frac{S-w}{\phi} - \frac{p(\theta)\eta}{(1-p(\theta))\phi}, \theta^h \in [\theta^*; \theta^3], \phi > \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta + p(\theta)}.$$

Aggregate worker utility, V_w, sums up all different utility levels of the different types of workers: workers who do not apply to DI and work, of whom only a fraction is accommodated, and workers who apply to DI of whom only a fraction p gets DI and the others return to work, and workers who apply to DI but do not return to work if they do not receive DI. Hence, the aggregate utility function is given by:

$$\begin{aligned} V_w(\eta, b, \theta^e) = & \underbrace{\int_0^{\theta^*} (u(w-\tau) - \theta) dF(\theta)}_{\text{healthy workers who all work}} + \underbrace{\int_{\theta^1}^{\theta^*} v dF(\theta)}_{\text{accommodated workers}} \\ & + \underbrace{\int_{\theta^*}^{\theta^h} \big(p(\theta;\theta^e)u(b) + (1-p(\theta;\theta^e))(u(w-\tau)-\theta)\big) dF(\theta)}_{\text{workers who applied to DI, a fraction } p \text{ gets DI, the other fraction works, unaccommodated}} \\ & + \underbrace{\int_{\theta^h}^{\bar{\theta}} \big(p(\theta;\theta^e)u(b) + (1-p(\theta;\theta^e)u(s)\big) dF(\theta).}_{\text{workers who applied to DI, a fraction } p \text{ gets DI, the others get social assistance}} \end{aligned}$$

workers are compliers with respect to accommodation - who will all be accommodated) rather than the employer problem. Since η does not affect the employee directly, the threshold does not shift. Therefore, there is no effect on accommodation and the people that apply to DI. There only is an effect on θ^h, the employer hiring threshold. Therefore, the $A'(\eta)$ and $DI'(\eta)$ terms drop out of the optimality condition. The same logic applies to when $\theta^2 < \theta^*$: $A'(\eta)$ and $DI'(\eta)$ also drop out there.

The government budget constraint, $G(\eta, b, \theta^e) \geq -\bar{G}$, is given by:

$$G(\eta, b, \theta^e) = \tau \cdot \Big[\int_0^{\theta^*} dF(\theta) + \int_{\theta^*}^{\theta^h} (1 - p(\theta; \theta^e))dF(\theta)\Big] - b \cdot \int_{\theta^*}^{\bar{\theta}} p(\theta; \theta^e)dF(\theta)$$
$$+ \eta \cdot \int_{\theta^*}^{\theta^h} p(\theta; \theta^e)dF(\theta) - s \cdot \int_{\theta^h}^{\bar{\theta}} (1 - p(\theta; \theta^e))dF(\theta) \geq -\bar{G}.$$

In the following parts, I derive the first-order conditions with respect to the experience rating fee η, disability benefits b and the DI eligibility threshold θ^e, to define the government's optimal policy parameters.

4.3.1 Optimal level of experience rating

The first-order condition with respect to the level of the experience rating fee η is given by:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \eta} = \frac{\partial V_w(\eta, b, \theta^e)}{\partial \eta} + \lambda \frac{\partial G(\eta, b, \theta^e)}{\partial \eta} = 0. \tag{5}$$

In Appendix A.3, I derive the partial derivatives of Equation 5 and show that the first-order condition with respect to η can be written as:

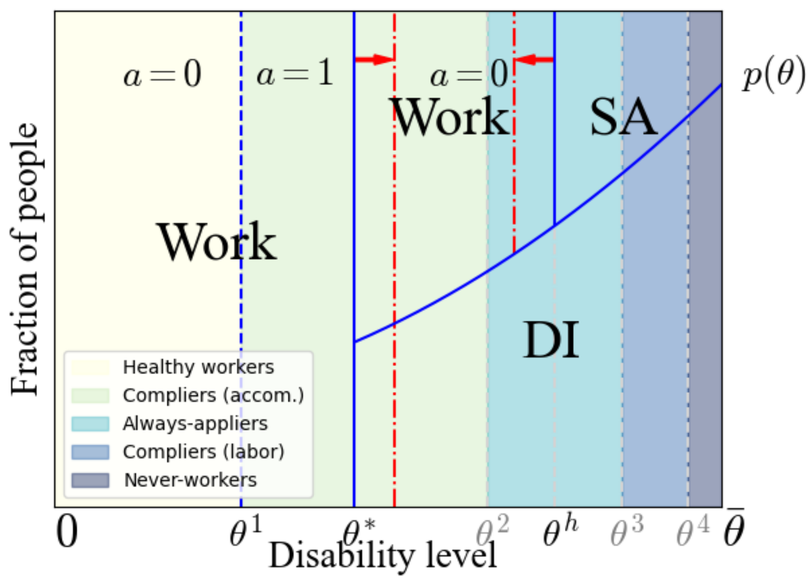
$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \eta} = \underbrace{A'(\eta)v + DI'(\eta)[u(b) - u(w - \tau) + \theta^*] + SA'(\eta)[u(s) - u(w - \tau) + \theta^h]}_{\text{utility effect of increasing experience rating fee}} \tag{6}$$
$$+ \lambda \Bigg[\underbrace{B(\eta) + M(\eta)}_{\text{fiscal cost effect}}\Bigg].$$

in which I define $M(\eta) \equiv E$ as the mechanical fiscal effect of increasing η and $B(\eta) \equiv \tau L'(\eta) - bDI'(\eta) + \eta E'(\eta) - sSA'(\eta)$ as the behavioral fiscal effect, following the notation of Haller et al. (2024). I also used here that the number of people who are accommodated is defined as A: $A \equiv \int_{\theta^1}^{\theta^*} dF(\theta)$. The first terms of this condition are the utility changes caused by increasing experience rating, and the final terms comprise the fiscal implications. Both effects ambiguous: neither the utility effect nor the fiscal effect has a predetermined sign.

The intuition behind Condition 6 is illustrated in Figure 3, which depicts the comparative statics of increasing the experience rating fee. On the one hand, experience rating creates a financial incentive for firms to accommodate more workers as accommodation can prevent compliers with respect to application from applying to DI, which eliminates the risk of having to pay the experience rating fee. Thus, the employer accommodation threshold θ^* shifts to the right. This implies that more workers will be accommodated ($A'(\eta) > 0$), who gain accommodation utility v. These workers now refrain from applying to DI. A fraction p of them ($DI'(\eta) < 0$) would otherwise have received DI benefits, but are now employed.

However, for workers with severe disabilities, experience rating can create such a high financial risk that firms will no longer hire them due to negative expected profits. The hiring threshold θ^h shifts to the left. Hence, fewer people are hired. Among them, a fraction $1 - p$ now receives social assistance rather than working ($SA'(\eta) > 0$), while for the remaining fraction p, little changes as they would obtain DI regardless of whether they were hired.

Figure 3: *Comparative statics of an increase in the level of experience rating*



Notes: This figure shows comparative statics of increasing the level of the experience rating fee η. The accommodation threshold θ^* shifts to the right, increasing accommodation and reducing the number of DI applicants. At the same time, the hiring threshold θ^h shifts to the left, leaving more workers unemployed.

Next to the impacts on the utility of workers, the government must take the impact on the taxpayer's costs into account. This can be divided into a mechanical ($M(\eta)$) and behavioral effect ($B(\eta)$). The mechanical effect of increasing the experience rating fee by 1 euro is E: for each worker at a firm that was hired but now receives DI, the firm has to pay a higher fee, which is collected by the government. The behavioral fiscal effect consists of three components. First, the number of working people who pay the labor tax changes ambiguously, as there will be fewer people applying to DI but also more people unemployed because of selective hiring. Hence, the fiscal impact can be either positive or negative, and will be $\tau L'(\eta) \gtreqless 0$. Next, fewer people will apply to DI, so there will be fewer DI recipients. The fiscal impact is $-bDI < 0$. Finally, the experience rating fee has to be paid for fewer workers, so the fiscal impact is negative and is given by $\eta E'(\eta) < 0$.

The first-order condition with respect to η can be rewritten so that it indicates whether increasing experience rating increases social welfare or not:

Proposition 5 *In an economy with information asymmetries, low profitability, and a relatively high productivity loss caused by disability, the welfare-optimizing level of experience rating is determined by:*

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \eta} \gtreqless 0 \Leftrightarrow$$
$$\frac{1}{\lambda M(\eta)}\Big(A'(\eta)v + DI'(\eta)(u(b) - u(w-\tau) + \theta^*)$$
$$+ SA'(\eta)(u(s) - u(w-\tau) + \theta^h)\Big) \gtreqless -\Big(1 + \frac{B(\eta)}{M(\eta)}\Big).$$

Proof 3 *See Appendix A.3.*

The left-hand side of this condition is the total utility change for workers caused by increasing the experience rating fee by 1 euro. This is converted to monetary units per mechanically saved euro for the government by increasing the experience rating fee, by dividing the utility changes by λ and $M(\eta)$. The right-hand side is the total fiscal impact of increasing the experience rating fee by 1 euro, consisting of the behavioral and mechanical effect. Note that theoretically, both sides are ambiguous: experience rating does not necessarily increase utility, nor does it necessarily increase or decrease the fiscal position of the government.

4.3.2 Optimal level of DI benefits

The government also determines the DI benefit level to maximize social welfare. I focus on the effects of a decrease in DI benefits, following Haller et al. (2024) in their argumentation that most policy debates concern decreasing the generosity of DI benefits to curb DI inflow. The first-order condition with respect to $-b$ is:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial(-b)} = \frac{\partial V_w(\eta, b, \theta^e)}{\partial(-b)} + \lambda \frac{\partial G(\eta, b, \theta^e)}{\partial(-b)}. \tag{7}$$

In Appendix A.4, I derive that the first-order condition with respect to $-b$ can be written as:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial(-b)} = \underbrace{u'(-b)DI + A'(-b)v}_{\text{utility effect of decreasing benefit level}} + \lambda \Bigg[\underbrace{M(-b)}_{\text{fiscal cost reduction}} \Bigg] = 0. \tag{8}$$

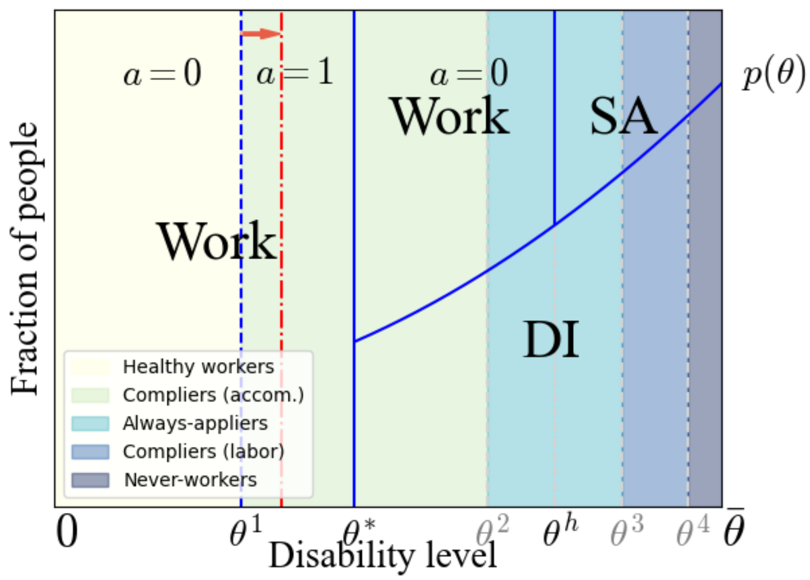
in which the mechanical fiscal effect of $-b$ is defined as $M(-b) = DI$. The condition comprises a negative utility effect: DI recipients lose utility from benefits and fewer workers will be accommodated, but a positive impact on the government budget, as the DI system becomes less costly.

Condition 8 can be interpreted as follows. Figure 4 shows comparative statics of a DI benefit reduction. When DI benefits become less generous, the share of people receiving DI (DI) lose utility ($u'(-b) < 0$). Moreover, fewer people will be accommodated because more workers become never-appliers. This can be explained as follows. Since DI becomes less attractive, more people would never apply to DI, regardless of accommodation, implying that θ^1 shifts to the right. Firms anticipate this and do not accommodate this group of workers ($A'(-b) < 0$) since they do not accommodate never-appliers, and these workers lose utility of accommodation v. Thus, the utility effect is negative: fewer workers are accommodated, and DI recipients lose a part of their benefits.

Intuitively, one would expect an increase in the number of DI applicants, as happens in the Diamond and Sheshinski (1995) model. Yet, in this regime of low profitability, compliers with respect to application are governed by the employer threshold instead: since $\theta^1 < \theta^* < \theta^2$, the threshold that determines from which point on people will apply to DI is θ^*, which does not change when b changes. Yet, if, instead θ^* is smaller than θ^1 or larger than θ^2, there will be a change in employee moral hazard (fewer applicants since DI is less attractive), and a term $DI'(b)[u(b) - u(w - \tau) + \theta^*]$ will be added to the first-order condition, while the $A'(b)(v)$ term (change in employer behavior) drops out. I show this in Appendix B.1.

The fiscal effect of reducing DI benefits is purely mechanical, as the only behavioral change concerns a change in accommodation, which does not influence the government budget constraint. The mechanical effect is a reduction in the government's DI expenditures, resulting in a fiscal cost decrease of size DI.

Figure 4: *Comparative statics of increase in the disability benefit level*



Notes: This figure shows the comparative statics of a reduction in the DI benefit level. The threshold that determines whether a worker is a never-applier or a complier with respect to accommodation, θ^1 shifts to the right, to which employers respond by not accommodating these workers anymore.

Rewriting the first-order condition gives the optimality condition for the benefit level b:

Proposition 6 *In an economy with information asymmetries, low profitability, and a relatively high productivity loss caused by disability, the welfare-optimizing level of DI benefit generosity is determined by:*

$$\frac{\partial \mathcal{L}}{\partial(-b)} \gtrless 0 \Leftrightarrow \frac{u'(-b)DI + A'(-b)v}{\lambda M(-b)} \gtrless -1.$$

Proof 4 *See Appendix A.4*

The left-hand side of this equation represents the total utility change per mechanically saved dollar from lowering DI benefits, expressed in monetary terms through λ. Individuals receiving DI lose utility due to the reduction in benefit generosity $u'(-b)$, while fewer workers are accommodated, losing utility from accommodation v. The right-hand side captures the total fiscal effect per mechanically saved dollar, which equals one, since there is no behavioral fiscal effect in this case, as the mechanical effect simply reflects the reduction in DI expenditures. Thus, policymakers should trade off fiscal cost reduction against utility losses.

4.3.3 Optimal level of the DI eligibility threshold

Finally, the government wants to set the optimal level of the eligibility rule θ^e, determining which applicants obtain DI. The first-order condition with respect to θ^e can be found by:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \theta^e} = \frac{\partial V_w(\eta, b, \theta^e)}{\partial \theta^e} + \lambda \frac{\partial G(\eta, b, \theta^e)}{\partial \theta^e}. \tag{9}$$

I derive the individual partial derivatives of this first-order condition in Appendix A.5. This yields the following first-order condition for θ^e:

$$\begin{aligned}\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \theta^e} &= \underbrace{DI'_B(\theta^e)(u(b) - u(w-\tau) + \theta^*) + SA'_B(\theta^e)(u(s) - u(w-\tau) + \theta^h) + A'(\theta^e)v}_{\text{utility effect of increasing } \theta^e} \\ &+ \underbrace{[DI'_M(\theta^e) + SA'_M(\theta^e)](u(b) - u(w-\tau) + \theta) + SA'_M(\theta^e)(u(s) - u(b))}_{\text{utility effect of increasing } \theta^e} \\ &+ \lambda[\underbrace{B(\theta^e) + M(\theta^e)}_{\text{fiscal cost effect}}] = 0, \end{aligned} \tag{10}$$

in which SA'_B and DI'_B refer to the behavioral impacts of increasing the eligibility criteria: shifting the accommodation threshold θ^* to the left and shifting the hiring threshold θ^h to the right. SA'_M and DI'_M refer to the mechanical impact of increasing the eligibility criterial: $p(\theta)$ is shifted downward. See Appendix A.5 for the derivations. Moreover, I define the mechanical fiscal impact of increasing θ^e and the behavioral fiscal effect of increasing θ^e as follows:

$$M(\theta^e) \equiv -\int_{\theta^*}^{\theta^h} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta)(b + \tau - \eta) - \int_{\theta^h}^{\bar{\theta}} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta)(b - s).$$

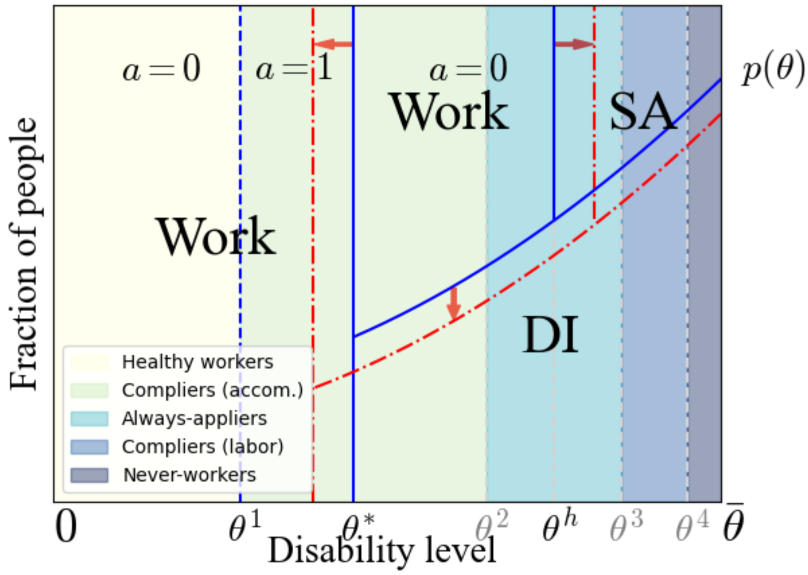
$$M(\theta^e) \equiv \tau L'_M(\theta^e) - bDI'_M(\theta^e) + \eta E'_M(\theta^e) - sSA'_M(\theta^e).$$

$$B(\theta^e) \equiv \tau L'_B(\theta^e) - bDI'_B(\theta^e) + \eta E'_B(\theta^e) - sSA'_B(\theta^e).$$

in which the subscript M and B also indicate the mechanical (M) and behavioral (B) impacts for the number of people for whom experience rating is paid (E) and the number of people working (L).

The following intuition lies behind Condition 10. Figure 5 displays comparative statics of increasing the eligibility threshold θ^e. Increasing θ^e means that entering disability becomes stricter and less accessible. It causes three shifts in Figure 5: *i*) for a given disability level θ it becomes less likely that a worker receives DI, so $p(\theta)$ shifts down, *ii*) the accommodation threshold θ^* shifts to the left, and *iii*) the hiring threshold θ^h shifts to the right.

Figure 5: *Comparative statics of an increase in the eligibility threshold*



Notes: This figure shows the comparative statics of an increase in the eligibility criteria strictness. The firm accommodation threshold θ^* shifts to the left, causing fewer people to be accommodated. As a response, these people apply to DI and a fraction $p(\theta)$ of them receives DI benefits. The hiring threshold θ^h shifts to the right, meaning that more workers will be employed. Mechanically, the probability of receiving DI benefits $p(\theta)$ shifts down for all DI applicants.

The first shift is mechanical: a smaller fraction of DI applicants receives DI when the eligibility threshold is set higher ($DI'_M < 0$). These workers now now either have to work or receive SA ($SA'_M > 0$).

Intuitively, a decrease in the likelihood of a worker getting into DI means that the threat of experience rating for the firm is lower. As a consequence, firms will feel less incentivized to accommodate compliers with respect to accommodation to prevent them from applying to DI, since the risk of having to pay the experience rating fee is not as high as before. Thus, θ^* shifts to the left and fewer people will be accommodated ($A'(\theta^e) < 0$), who lose utility of accommodation v. This implies that these workers, who are compliers with respect to application, will now start to apply to DI. Of them, a fraction gets in ($DI'_B(\theta^e) > 0$) and receives $u(b)$ instead of working.

An opposite shift occurs regarding hiring behavior. Firms will hire more workers due to the reduced experience rating fee, meaning that θ^h shifts to the right. The affected workers, $SA'_B < 0$, will now work, rather than receive social assistance. Because the change in the number who receive DI is ambiguous, the change in the number of people for whom the experience rating fee is paid is also ambiguous: more hires increases the number, but the likelihood of obtaining DI going down decreases the number.

These changes also affect the government budget constraint. The mechanical effect of increasing θ^e is that a part of the people who applied to DI and previously would get DI but would work if they do not receive DI, now has to work instead. For these people, no DI benefits have to be paid by the government, labor tax income is now earned, and no experience rating fee is paid by the firm to the government. The people who previously would get DI but would not work if they do not receive it, now receive social assistance. This results in a spendings reduction of DI benefits, but additional social assistance government spending. The behavioral effect of increasing θ^e is an ambiguous effect on the number of people employed, who pay labor tax. Moreover, there also is an ambiguous effect on the people of DI and the number of workers for whom the experience rating fee is paid.

The first-order condition can be rewritten into the optimality condition for the DI eligibility rule:

Proposition 7 *In an economy with information asymmetries, low profitability, and a relatively high productivity loss caused by disability, the welfare-optimizing level of the DI eligibility threshold is determined by:*

$$
\begin{aligned}
&\frac{\partial \mathcal{L}}{\partial(\theta^e)} \gtreqless 0 \Leftrightarrow \\
&\frac{1}{\lambda M(\theta^e)}\Big(DI'_B(\theta^e)(u(b)-u(w-\tau)+\theta^*)+SA'_B(\theta^e)(u(s)-u(w-\tau)+\theta^h)+A'(\theta^e)v \\
&+[DI'_M(\theta^e)+SA'_M(\theta^e)](u(b)-u(w-\tau)+\theta)+SA'_M(\theta^e)(u(s)-u(b)\Big) \\
&\gtreqless -\Big(1+\frac{B(\theta^e)}{M(\theta^e)}\Big).
\end{aligned}
$$

Proof 5 *See Appendix A.5.*

Again, the left-hand side is the total utility change per mechanically saved dollar by increasing θ^e converted to monetary terms by λ. The right-hand side is the total fiscal effect per mechanically saved dollar. Both the sign of the utility effect and the sign of the fiscal cost effects are theoretically ambiguous.

What can be learned from endogenizing employer behavior. The Diamond and Sheshinski (1995) model characterizes optimal benefits and eligibility while accounting only for worker behavior, abstracting from the impact of firms through hiring and accommodation responses.

Regarding the former policy instrument, their framework predicts that a reduction in benefit generosity leads to fewer DI applicants and hence recipients. This prediction changes when employer behavior is endogenized. Under Assumption 6, a benefit reduction now causes more workers not to apply for DI, regardless of accommodation. Firms, in turn, stop accommodating these workers, whereas previously, they would have done so to prevent applications, but the overall number of DI applicants remains unchanged.

However, when the hiring threshold lies outside the worker thresholds θ^1 and θ^2, compliers with respect to accommodation are either all accommodated and start to apply from θ^2 on, or, all unaccommodated, applying from disability θ^1 on. These thresholds depend on benefit generosity b and shift leftward as benefits become less generous. In that case, outcomes resemble the baseline Diamond and Sheshinski (1995) setting without employer behavior.

Turning to eligibility strictness, the Diamond and Sheshinski (1995) model predicts that tighter screening reduces DI applications and recipients, by lowering the expected utility of applying and by a mechanical reduction in the award rate. In contrast, when firm behavior and experience rating are considered, stricter eligibility can have the opposite effect on applications. A tighter eligibility threshold reduces firms' expected DI costs, leading them to accommodate more workers who then do not apply to DI. Firms also increase hiring, as the threat of experience rating declines.

Overall, these results show that firm responses can substantially alter the effects of standard DI policy instruments, such as benefit generosity and eligibility strictness, that are typically designed with only worker incentives in mind. Accounting for employer behavior is therefore crucial for the optimal design of disability insurance and other social insurance programs.

4.4 Social planner solution

To illustrate how the information asymmetries in the main model, where the government cannot observe disability θ or accommodation a, give rise to behavioral responses by workers and firms, I consider the social planner economy.

In this benchmark setting, the social planner observes θ and can directly choose the benefit level b, the eligibility threshold θ^e, and the level of firm accommodation a. Because disability is observable, the planner can fully determine which workers receive DI benefits. Hiring decisions follow mechanically from the eligibility threshold: firms do not employ workers with disability levels above θ^e so there is no need for the planner to separately specify a hiring rule.

The planner maximizes a utilitarian social welfare function of aggregate indirect utility $V_w(\theta^e, b, a)$, subject to a balanced budget equating total taxes and total DI expenditures. The corresponding Lagrangian is given by:

$$\max_{\theta^e, b, a} \mathcal{L}(\theta^e, b, a) = V_w(\theta^e, b, a) + \lambda(G(\theta^e, b)),$$

where aggregate worker utility $V(\theta^e, b, a)$ is given by:

$$V(\theta^e, b, a) = \underbrace{\int_0^{\theta^e} \big(u(w-\tau) - \theta + \mathbb{1}_a v\big) dF(\theta)}_{\text{utility of employed workers}} + \underbrace{\int_{\theta^e}^{\bar{\theta}} u(b) dF(\theta)}_{\text{utility of DI recipients}},$$

and total fiscal revenue is given by:

$$G(\theta^e, b) = \tau \cdot \int_0^{\theta^e} dF(\theta) - b \cdot \int_{\theta^e}^{\bar{\theta}} dF(\theta).$$

To solve the model, I take the first-order conditions with respect to a, θ^e, $-b$, and λ.

Regarding accommodation a, since it increases worker utility by $v > 0$, the optimal level is $a = 1$ for all hired workers, as shown in Appendix A.6. Hence, when $v > 0$, which can be reasonably assumed, all firms employing workers who do not receive DI ($\theta < \theta^e$) should provide accommodation. In the first-best scenario, accommodation has no fiscal impact because it affects only workers' utility and does not generate behavioral spillovers on the fiscal side; there is no moral hazard from either firms or workers. Therefore, when information asymmetries are absent, it is optimal that all employed workers are accommodated.

The first-order condition with respect to the eligibility threshold θ^e is given by:

$$u(w-\tau) - \theta^e + \mathbb{1}_a v - u(b) = -\lambda(\tau + b),$$

while the first-order condition with respect to the negative of the benefit level $-b$ equals:

$$\int_{\theta^e}^{\bar{\theta}} u'(-b)dF(\theta) = -\lambda \int_{\theta^e}^{\bar{\theta}} dF(\theta).$$

Finally, the first-order condition with respect to λ repeats the balanced budget constraint:

$$\tau \int_{0}^{\theta^e} dF(\theta) = b \int_{\theta^e}^{\bar{\theta}} dF(\theta).$$

Combining them yields the final optimality condition:

$$u(w-\tau) - \theta^e + v - u(b) = -u'(b)b\left[1 + \frac{DI}{L}\right]. \tag{11}$$

This condition shows that increasing θ^e, which shifts workers from DI receipt to employment, involves several trade-offs. Workers who move from DI to employment gain utility from working rather than receiving benefits. To maintain budget balance, this change must equal the marginal utility effect of the corresponding fiscal adjustment: higher labor tax revenues allow for higher DI benefits. However, those who transition to employment lose the indirect utility gain that results from the reduced fiscal pressure enabling higher benefits. Importantly, in this first-best setting, all effects are purely mechanical: workers switch states because the planner dictates it, not due to behavioral responses.

Overall, this analysis illustrates that in the social planner economy, where disability and accommodation are observable, a single disability threshold determines DI receipt, fully eliminating worker-side moral hazard. Employer moral hazard is also absent, as it is socially optimal for all employed workers to be accommodated.

5 Experience rating: The economy without it, and its welfare impact

In the main model, the experience rating fee is positive. What would happen to the economy and the optimality conditions when experience rating is set to zero? In this section, I describe the economy without experience rating and show which parameters determine if and how experience rating can affect social welfare.

Economy without experience rating. I consider the economy when the experience rating fee η is set to zero. Again following the backwards induction strategy, I start by the best responses of the worker. The worker's optimization problems for DI application (Equation 1) and labor supply (Equation 2) do not depend on η because the worker does not take experience rating into account. Therefore, the best responses of the worker remain unchanged.

The firm's, however, does take experience rating into account, implying that the firm's best responses are different without experience rating. With $\eta = 0$, the optimization problem of the firm becomes:

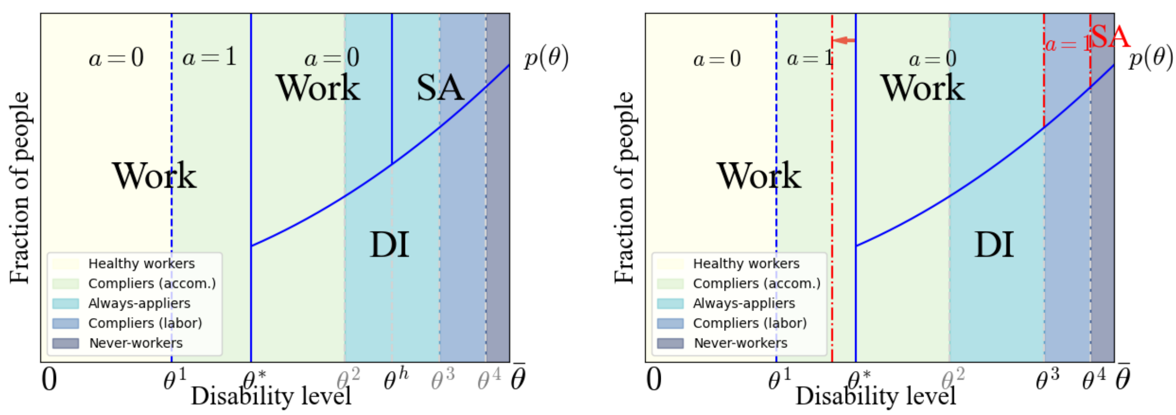
$$\max_{h\in\{0,1\},a\in\{0,1\}} hE(\pi)$$

with

$$E(\pi) = \gamma\left[(1-p(\theta))\left[(1-l)(S-w-\phi\theta+\mathbb{1}_a v)\right]\right] + (1-\gamma)\left[S-w-\phi\theta+\mathbb{1}_a v\right].$$

Figure 6: *The economy with and without experience rating*

(a) *Experience rating* (b) *No experience rating*



Notes: Panel (a) shows the economy when experience rating is present, under a low profitability regime. Panel (b) shows the economy without experience rating, also under low profitability. The accommodation threshold θ^* is lower when there is no experience rating, while the hiring threshold no longer exists without experience rating - firms only stop hiring when the worker would never stay at the firm, i.e., when disability is larger than θ^4.

I derive the firm's accommodation and hiring thresholds in an economy without experience rating in Appendix C.1, by comparing expected profits with and without accommodation and identifying when profits turn negative to obtain the new accommodation and hiring threshold. I find that the employer accommodation threshold θ^* loses its η-term: $\theta^* = \frac{\chi - e}{p(\theta)\phi} + \frac{S-w}{\phi}$ instead of $\theta^* = \frac{\chi - e}{p(\theta)\phi} + \frac{S-w+\eta}{\phi}$. Intuitively, Figure 6 illustrates that the accommodation threshold θ^* shifts leftward in the absence of experience rating, meaning fewer workers are accommodated. With experience rating, firms have a large incentive to accommodate to avoid DI costs; without it, firm profits are zero rather than $-\eta$ when a worker receives DI. Hence, expected profits when a worker applies to DI are higher without experience rating, reducing firms' incentives to accommodate.

Regarding the hiring threshold, I again consider the disability level beyond which expected profits turn negative. Without experience rating, however, expected profits never become negative for employed workers because of Assumption 3, which states that profits are always positive when employment occurs. This assumption ensures that negative labor demand-side effects arise only when experience rating is present. Consequently, the hiring threshold coincides with disability threshold θ^4: workers who are never-suppliers and would never choose to work are not hired. In Figure 6, this is reflected by the absence of θ^h; instead, θ^4 marks the disability level beyond which individuals receive social assistance after DI rejection. To summarize, without experience rating, no individuals who wish to work are left unhired, since I abstract from other market frictions that could create mismatches between labor demand and supply.

To summarize, relative to the economy with experience rating, *(i)* the firm's accommodation threshold is lower, and *(ii)* the hiring threshold coincides with the employee threshold θ^4, beyond which individuals would never choose to work.

The government optimization problem changes to:

$$V_w(\eta, b, \theta^e) = \underbrace{\int_0^{\theta^*} (u(w-\tau)-\theta)dF(\theta)}_{\text{healthy workers who all work}} + \underbrace{\int_{\theta^1}^{\theta^*} v dF(\theta)}_{\text{accommodated workers}}$$

$$+ \underbrace{\int_{\theta^*}^{\theta^4} \big(p(\theta;\theta^e)u(b) + (1-p(\theta;\theta^e))(u(w-\tau)-\theta)\big)dF(\theta)}_{\text{workers who applied to DI, a fraction } p \text{ gets DI, the other fraction works, unaccommodated}}$$

$$+ \underbrace{\int_{\theta^4}^{\bar{\theta}} \big(p(\theta;\theta^e)u(b) + (1-p(\theta;\theta^e)u(s)\big)dF(\theta).}_{\text{workers who applied to DI, a fraction } p \text{ gets DI, the others get social assistance}}$$

with

$$\theta^* = \frac{\chi - e}{p(\theta^*)\phi} + \frac{S-w}{\phi}, \theta^1 = u(w-\tau) - u(b), \text{ and } \theta^4 = u(w-\tau) - u(s) + v.$$

The new government budget constraint is:

$$G(\eta, b, \theta^e) = \tau \cdot \Big[\int_0^{\theta^*} dF(\theta) + \int_{\theta^*}^{\theta^4} (1-p(\theta;\theta^e))dF(\theta)\Big] - b \cdot \int_{\theta^*}^{\bar{\theta}} p(\theta;\theta^e)dF(\theta)$$
$$+ \eta \cdot \int_{\theta^*}^{\theta^4} p(\theta;\theta^e)dF(\theta) - s \cdot \int_{\theta^4}^{\bar{\theta}} (1-p(\theta;\theta^e))dF(\theta) \geq -\bar{G}.$$

The first-order conditions for eligibility and benefit generosity change slightly. Specifically, the optimality condition for the eligibility criterion θ^e changes, while that for the DI benefit level b remains the same. That is, the behavioral effect of θ^e on the number of social assistance recipients disappears, as θ^e no longer affects the hiring threshold θ^h. With experience rating, the eligibility level θ^e influenced θ^h through the firm's expected chance of having to pay the experience rating fee. This effect vanishes without experience rating. See Appendix C.1 for the new optimality condition.

Welfare impact of experience rating. The previous exercise again shows that experience rating increases accommodation, reducing DI applications, but also discourages hiring, pushing more people towards social assistance. To quantify whether and under which conditions these opposing effects raise or lower welfare, the relative magnitudes of the terms in the optimality condition for experience rating (Proposition 5) must be compared. The condition equates the utility impact (left-hand side) to the negative of the fiscal impact (right-hand side).

In Appendix C.2, I derive the signs of the individual terms of the optimality condition for experience rating. Without empirical evidence, both sides remain ambiguous: whether experience rating improves welfare is ultimately an empirical question. Still, some qualitative insights can be drawn. A higher v strengthens the utility gain from increased accommodation without fiscal cost. A lower disability benefit b raises utility (by reducing the loss of accommodated workers who would otherwise receive DI) but reduces the fiscal gain from fewer DI payments. A smaller social assistance benefit s limits the fiscal loss from higher social assistance inflow but amplifies the negative utility effect from lower employment. Finally, the distribution of disability levels matters: when $f(\theta^*)$ is much larger than $f(\theta^h)$, more weight is placed on the accommodation effect and its impact on DI inflow than on the hiring effect.

6 Discussion

In the baseline model, I make several assumptions on parameter values, which I assess in the next subsections. I also consider a social welfare function that includes firm profits and discuss several possible model extensions.

6.1 High profitability economy

In the baseline model, I assume that expected profits turn negative over the disability range $[\theta^2, \theta^3]$, representing a *low profitability* economy. However, profits could also become negative in a higher disability range $[\theta^3, \theta^4]$, corresponding to a *high profitability* economy.

In Appendix B.1, I analyze this case. Here, the hiring threshold θ^h lies between θ^3 and θ^4. The economy shifts slightly (fewer workers are hired, and these workers either work unaccommodated or receive DI) but the optimality conditions remain the same as in the low profitability regime, except for the redefined hiring threshold.

6.2 The employer accommodation threshold outside its bounds

In the main model, I assume that the employer accommodation threshold θ^* lies strictly within the employee thresholds θ^1 and θ^2, which separate never-appliers, compliers with respect to application, and always-appliers. This implies that the disability level where accommodation is no longer profitable lies within the range where workers are compliers: those with a lower disability than θ^* are accommodated, while those with a higher level are not. When $\theta^* < \theta^1$, all compliers with respect to application are accommodated, and when $\theta* > \theta^2$, none of them are. In Appendix B.2, I derive the optimality conditions for these cases.

When $\theta^* < \theta^1$, none of the compliers with respect to application are accommodated. Relative to the main model, two terms drop from the optimality condition for experience rating: the utility changes from a rightward shift in θ^* (more accommodation) and the accompanying change in DI inflow ($A'(\eta)$ and $DI'(\eta)$). These terms drop out because the accommodation threshold is not effective under this parameterization as none of the compliers with respect to accommodation will be accommodated - so a marginal change in experience rating will not affect accommodation. This can be interpreted as a situation in which there are workers who would respond to accommodation efforts by not applying to DI anymore, yet, for the firm, the relative costs of accommodating are so high that the potential benefit of them not applying to DI does not weigh up to the cost, not even with experience rating.

When $\theta^* > \theta^2$, all compliers with respect to application are accommodated. By the same logic, marginal changes in experience rating again have no effect on accommodation, and the same two terms drop out of the optimality condition: $A'(\eta)$ and $DI'(\eta)$. This corresponds to the situation in which the people who would respond to accommodation by not applying are already all accommodated because the net cost of accommodation is so low that firms accommodate regardless of experience rating.

Together, one of these regimes may provide an explanation for the empirical finding that experience rating is not always effective in increasing accommodation efforts and reducing DI inflow, as found by e.g. Jansen et al. (2025) who find no effect of experience rating on accommodation of long-term sick listed workers in the Netherlands, Kyyrä and Paukkeri (2018) who find no effect of experience rating on DI inflow using Finnish data and Koning et al. (2025) who find the same using Dutch data.

6.3 Relatively low productivity loss caused by disability

In the baseline model, I assume that the productivity loss caused by disability ϕ is relatively large $\left(\phi > \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta+p(\theta)}\right)$. When the opposite is true, employers do not accommodate compliers with respect to accommodation up to the θ^* threshold, but do accommodate them after. This changes the allocation of workers regarding work and DI. In Appendix B.3, I derive the corresponding optimality conditions.

The key difference compared to the case with a relatively high productivity loss ϕ is that employer behavior around the accommodation threshold θ^* switches. With high ϕ, firms accommodate from θ^1 up to θ^* but stop thereafter, so employees apply to DI only beyond θ^*. With low ϕ, firms do not accommodate from θ^1 to θ^* (these workers apply to DI) but do accommodate those between θ^* and θ^2, who thus remain employed. Consequently, θ^2 becomes an effective threshold affecting the allocation of workers.

This behavioral reversal changes the composition of workers and accommodation, and therefore alters both total utility and the government budget. Regarding the optimality condition for the level of experience rating, the included terms remain as in Proposition 5. Yet, the signs of the key effects reverse. The accommodation threshold still shifts to the right, but now, fewer people will be accommodated and more apply to DI.

The optimality condition for the level of DI benefits gains additional terms. Because both θ^1 and θ^2 are now effective, benefit generosity affects the number of DI applicants and recipients. A shift in θ^1 now indicates a shift in behavior (from θ^1 to θ^*, people apply to DI while before θ^1 they do not), and θ^2 has also become effective: from that point on, everyone applies to DI. When DI benefit generosity is decreased, θ^1 shifts to the right: DI is less attractive so fewer people apply and fewer become recipients. θ^2 also shifts to the right, so there are more compliers with respect to accommodation and fewer always-appliers. This also reduces the number of DI applicants and recipients.

Finally, the optimality condition for the eligibility threshold includes the same terms in the baseline model but again reverses the signs of accommodation and DI application effects due to the behavioral switch around θ^*.

Ultimately, whether ϕ is relatively high or low is an empirical question. Observing that workers with lower disability levels are accommodated while those only slightly more disabled are not would be consistent with the model version featuring a low productivity loss.

6.4 Social welfare function that includes firm profits

As in Itskhoki and Moll (2019), who model entrepreneurs and workers and combine their respective utility functions in a single social welfare function, I also consider a welfare function that explicitly includes firm profits. This captures a policy environment in which the government places weight on firm profitability in addition to worker welfare. Assuming risk-neutrality of firms, the utility of the firm equals its profits. When firm profits are included, the government Lagrangian changes to:

$$\max_{\eta,b,\theta^e} \mathcal{L}(\eta, b, \theta^e) = V_w(\eta, b, \theta^e) + V_f(\eta, b, \theta^e) + \lambda(G(\eta, b, \theta^e) - \bar{G}),$$

subject to the same constraints as the main model. Aggregate firm profits are given by:

$$\begin{aligned} V_f(\eta, b, \theta^e) = &\int_0^{\theta^1} \big(S - w - \phi\theta\big) dF(\theta) + \int_{\theta^1}^{\theta^*} \big(S - w - \phi\theta + \chi - e\big) dF(\theta) \\ &+ \int_{\theta^*}^{\theta^h} \big(p(\theta; \theta^e) \cdot -\eta + (1 - p(\theta; \theta^e))(S - w - \phi\theta)\big) dF(\theta). \end{aligned}$$

The optimality conditions with respect to the three policy parameters, derived in Appendix B.4, now contain the partial derivative of $V_f(\eta, b, \theta^e)$ with respect to each policy parameter.

The intuition of the optimality conditions remains similar: they now additionally account for changes in firm profits. For instance, when accommodation increases as a response to a higher experience rating fee, this corresponds not only to a utility change of $A'(\eta)$ times v but also to an additional profit component $\chi - e$.

6.5 Other possible model extensions

To keep the model tractable and analytically solvable, I make several simplifying assumptions regarding firm and worker behavior. While these assumptions abstract from some real-world complexities, the model still captures the key mechanisms through which experience rating affects accommodation, DI applications, and employment. Below, I discuss the main assumptions and their implications.

For tractability, I assume that information between employer and employee is perfectly symmetric: the employer can fully observe the worker's disability shock. In reality, this is not entirely observable, though employers may infer disability levels from observable characteristics, as documented by Hill et al. (2016), who find that certain disabilities are more likely to be accommodated. Moreover, since there is empirical evidence of selective hiring, this signals that firms are able to infer disability risk (Hawkins and Simola, 2024; Prinz and Ravesteijn, 2020).

I also abstract from heterogeneous accommodation cost and gain functions across firms and assume that the direct accommodation cost exceeds the productivity gain in the main model. This implies that the modeled accommodation level serves as a lower bound: in practice, when the productivity gain exceeds the cost for some workers, accommodation would be higher.

Finally, the model is static and does not account for repeated interactions or on-the-job bargaining over accommodations. In reality, employees' health may evolve over time, leading to renegotiation of workplace accommodation, and firms may adjust accommodations gradually in response to these changing needs. The model also abstracts from short-term sick leave dynamics, where temporary absences could interact with accommodation decisions and DI applications. Despite these simplifications, the model captures the key immediate effects of employer incentives on accommodation, hiring, and DI inflow, and these dynamic aspects could be explored in future research.

7 Conclusion

Given today's high DI expenditures of many OECD countries, policymakers seek ways to curb costs without creating large insurance losses for its recipients. Standard social insurance theory balances insurance value with workers' incentives to work, but largely overlooks employer behavior. Firms can reduce DI inflow by accommodating workers after health shocks, yet may refrain from doing so when they are not responsible for DI costs. Policies that place this responsibility on firms may also lead to selective hiring, where workers with higher perceived disability risk are not hired. In this paper, I develop a model of optimal DI that accounts for both employer and employee behavior to evaluate the socially optimal level of experience rating, a policy that forces firms to internalize the DI costs of their employees. This framework not only identifies the optimal level of employer incentives such as experience rating, but also demonstrates how standard worker-side policy parameters, eligibility rules and benefit generosity, depend on employer behavior.

The analysis yields three key findings. First, experience rating simultaneously promotes accommodation and discourages hiring, and both forces are balanced in the optimal level. Second, endogenizing employer behavior in the sufficient-statistics framework reveals additional disability thresholds on which employers base their accommodation and hiring decisions and highlights how these interact with worker's DI application decisions. Third, even standard employee-side policy parameters, eligibility and benefit generosity, trigger employer responses. This implies that optimal DI design, even without policies aimed specifically at employees, must account for firm behavior.

This paper also offers several broader policy implications. While the analysis centers on experience rating, the findings extend to countries without employer incentives. A key result is that even worker-side policy parameters depend on employer responses. For countries considering the introduction of employer incentives to address unmet accommodation needs (see Maestas et al. (2019) for evidence on the US), it is important to weigh potential gains in accommodation against possible reductions in hiring. Complementary measures, such as hiring subsidies (see Aizawa et al. (2025)), may help counteract these unintended effects. Finally, to inform concrete policy design in countries with experience rating, such as the Netherlands, the sufficient-statistics formula I derive for experience rating needs to be estimated empirically, following approaches similar to Haller et al. (2024).

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A Appendix A: Proofs and derivations main model

A.1 Proof of Proposition 3 (best accommodation response of the firm)

The accommodation response for *never appliers* (with $\theta < \theta^1$) depends on the relative sizes of χ and e, as $\pi_{a=1} - \pi_{a=0} = \chi - e$. These individuals will not apply to DI when the firm is operational, regardless of whether accommodation is provided. Hence, only the productivity gain from accommodation (χ) must be compared to the cost of accommodation (e). For now, I assume that $\chi < e$ (Assumption 2). Thus, never appliers will not be accommodated.

The accommodation response for *compliers with respect to application* ($\theta^1 < \theta < \theta^2$), who do not apply when they are accommodated but do apply when they are not accommodated, depends on the disability level and on the relative size of the effect of disability on productivity (ϕ). Accommodation is either positive or negative up to a certain disability threshold $\theta^* \equiv \frac{\chi - e}{p(\theta^*)\phi} + \frac{S-w+\eta}{\phi}$.That is, $\pi_{a=1} - \pi_{a=0} = \chi - e + p(\theta)(S - w - \phi\theta) + p(\theta)\eta$, and then shifts sign after the threshold. This threshold is calculated by setting the profit difference ($\pi_{a=1} - \pi_{a=0}$) equal to zero and then solving for θ. Accommodation will only be provided when $\pi_{a=1} > \pi_{a=0}$. The two profit functions are equal when

$$S - w - \phi\theta + \chi - e = (1 - p(\theta))(S - w - \phi\theta) - p(\theta)\eta.$$

Rewriting this yields that the disability level θ^* at which the two are the same is the following:

$$\theta^* \equiv \frac{\chi - e}{p(\theta^*)\phi} + \frac{S - w + \eta}{\phi}.$$

Whether profits with or without accommodation are larger ($\pi_{a=1}$ or $\pi_{a=0}$) before or after θ^* depends on the relative steepness of the two profit function slopes with respect to θ. Both slopes are decreasing in θ. The slope of $\pi_{a=1}$ with respect to θ is steeper than the slope of $\pi_{a=0}$ with respect to θ when $\frac{\partial \pi_{a=1}}{\partial \theta} < \frac{\partial \pi_{a=0}}{\partial \theta}$. This is true when $\phi > \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta + p(\theta)}$.. This indicates that $\pi_{a=1}$ is larger than $\pi_{a=0}$ for values of θ lower than θ^*, and $\pi_{a=1}$ is lower than $\pi_{a=0}$ when θ is larger than θ^*. Hence, the optimal employer accommodation decision for compliers with respect to application is $a = 1$ for $\theta < \theta^*$, and $a = 0$ when $\theta > \theta^*$, in the case that ϕ is relatively large.

The proof behind this is the following. $\frac{\partial \pi_{a=1}}{\partial \theta} < \frac{\partial \pi_{a=0}}{\partial \theta}$ holds true when:

$$\begin{aligned}
\frac{\partial \pi_{a=1}}{\partial \theta} &< \frac{\partial \pi_{a=0}}{\partial \theta} \Leftrightarrow \\
-\phi &< -p'(\theta)(S - w - \phi\theta + \eta) - \phi(1 - p(\theta))\theta \\
-\phi - p'(\theta)\theta\phi + \theta(1 - p(\theta))\phi &< -p(\theta)(S - w + \eta) \\
\phi[-1 - p'(\theta)\theta + 1 - p(\theta)] &< -p'(\theta)(S - w + \eta) \\
\phi &> \frac{-p'(\theta)(S - w + \eta)}{-p'(\theta)\theta - p(\theta)} \\
\phi &> \frac{p'(\theta)(S - w + \eta)}{p'(\theta)\theta + p(\theta)}.
\end{aligned}$$

The reverse holds true when $\phi < \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta + p(\theta)}$. Then, $\frac{\pi_{a=1}}{\partial \theta} > \frac{\partial \theta_{a=0}}{\partial \theta}$.

The intuition is the following. In both cases (accommodation versus no accommodation), profits depend negatively on the disability level θ. When the firm accommodates ($\pi_{a=0}$), a higher disability decreases productivity and reduces profits by $-\phi$. When the firm does not accommodate ($\pi_{a=0}$), disability has three separate effects on profits: *i*) a higher disability increases the chance of having to pay the experience rating fee, reducing expected profits by $-p'(\theta)\eta$, *ii*) a higher disability decreases the chance of the worker staying at the firm, and hence, of positive profits, which reduces expected profits by $-p'(\theta)(S - w - \phi\theta)$, and *iii*) a higher disability decreases productivity so decreases the positive profits when the worker stays at the firm, reducing expected profits by $-(1 - p(\theta))\phi$. When the productivity loss effect (ϕ), which is the only effect on profits when the firm does accommodate, is relatively large, the profits with accommodation do not respond to an increase in disability as much as the profits without accommodation. Hence, profits when accommodating are higher up to the point that the two profit functions are equal to each other (when $\theta = \theta^*$), and lower beyond that point ($\theta > \theta^*$). The reverse is true when ϕ is relatively small.

For exposition reasons, I continue in the main text under the assumption that the productivity loss ϕ is relatively large (Assumption 5). In Section 6, I work out the opposite case and show how the results differ.

Moreover, I assume that the employer threshold θ^* lies strictly within the employee threshold (Assumption 6, see Section 6 for the general case in which the employer threshold may lie outside of these bounds.

Always appliers/always suppliers ($\theta^2 < \theta < \theta^3$), whose application and labor supply decisions do not depend on accommodation, will not be accommodated. That is, $\pi_{a=1} - \pi_{a=0} = (1 - p(\theta))(\chi - e) < 0$. These people always apply to DI and if they are rejected for DI, they stay at the firm. Hence, the only difference in profits for the firm when they accommodate compared to when they do not is that with probability $1 - p(\theta)$, when the worker is rejected and stays at the firm, the productivity gain from accommodation χ will materialize and the accommodation cost has to be made and cannot be recouped by selling.

Compliers with respect to labor supply ($\theta^3 < \theta < \theta^4$) will be accommodated as the profit difference is positive because of Assumption 3, $\pi_{a=1} - \pi_{a=0} = (1-p(\theta))(S-w-\phi\theta+\chi-e) > 0$. By accommodating these workers, who all apply to DI, the firm can keep the worker in the scenario that DI is not granted, unambiguously increasing profits.

Never suppliers ($\theta > \theta^4$) will not be accommodated as $\pi_{a=1} - \pi_{a=0} = 0$. Never suppliers always leave the firm, so no firm income is earned and the payoffs in both cases ($a = 1$ and $a = 0$) are the same ($-\eta$).

A.2 Proof of Proposition 4 (best hiring response of the firm)

To determine at which disability level the firm's expected profits turn negative and the firm no longer hires, I consider the profit levels at the different disability levels. I define the disability level above which profits are no longer positive as θ^h. Table 3 reports the different disability levels and the optimal accommodation responses of the firm is on each of these ranges, together with the expected profit when the firm would hire.

Table 3: *Possible locations for the hiring threshold: disability level ranges and their profit levels under optimal accommodation*

Disability range	a **on range**	π
$[0, \theta^1]$	0	$S - w - \phi\theta > 0$
$[\theta^1, \theta^*]$	1	$S - w - \phi\theta + \chi - e > 0$
$\boldsymbol{[\theta^*, \theta^3]}$	**0**	$\boldsymbol{(1 - p(\theta))(S - w - \phi\theta) - p(\theta) \cdot \eta \gtreqless 0}$
$\boldsymbol{[\theta^3, \theta^4]}$	**1**	$\boldsymbol{(1 - p(\theta))(S - w - \phi \cdot \theta + \chi - e) - p(\theta) \cdot \eta \gtreqless 0}$
$[\theta^4, \bar{\theta})]$	0	$-p(\theta)\eta < 0$

Notes: this table reports the different disability ranges, the accommodation decision of the firm at the respective range if the firm would hire, and the profit level if the firm would not. Only the second and third disability level ranges ($[\theta^*, \theta^3]$ and $[\theta^3, \theta^4]$) do not have unambiguously negative or positive profits, meaning that the hiring threshold lies within one of these ranges, depending on the parameterization of the model.

For some disability ranges it is unambiguous whether expected profits are positive or not, while for some it is not. For the healthiest workers with $\theta < \theta^*$, profits are positive because of Assumption 3, so it is optimal for the firm to hire, i.e., $h = 1$ for $\theta < \theta^*$. For the least healthy workers, profits are negative for sure from θ^4 on as workers either leave the firm to collect social assistance or DI, meaning that the firm makes no profits and risks paying the experience rating fee if the worker is hired. Thus, $h = 0$ is optimal for $\theta > \theta^4$. Somewhere between these disability levels, θ^* and θ^4, there will be a disability level above which the firm will stop hiring as expected profits turn negative.

In between these disability levels ($[\theta^*, \theta^4]$), profits are decreasing in θ. Hence, if profits are negative for a certain disability value in between θ^1 and θ^4, for any disability level beyond that, profits will remain negative. Therefore, I can distinguish two possible locations for the hiring threshold, which I define as θ^h: in $[\theta^*, \theta^3]$ and $[\theta^3, \theta^4]$.

For each of these two disability ranges, I calculate the threshold value θ^h by setting the profits in that range equal to zero. This leads to two possible hiring values which correspond to two profitability regimes.

Given that profits are still positive up to θ^*, the first option for the hiring threshold θ^h is in the range $[\theta^*, \theta^3]$. In this range, the optimal accommodation decision for the firm is *not* to accommodate, meaning that the worker will apply to DI but will remain employed when rejected for DI. Hence, expected firm profits are $(1 - p(\theta))(S - w - \phi\theta) - p(\theta) \cdot \eta$, which may or may not be positive. The expected profits equal exactly zero when:

$$(1 - p(\theta))(S - w - \phi\theta) - p(\theta) \cdot \eta = 0$$

rewriting for θ yields the hiring threshold θ^h:

$$\theta^h \equiv \frac{S - w}{\phi} - \frac{p(\theta)}{(1 - p(\theta))\phi}\eta$$

The derivative of the profits with respect to θ is:

$$\frac{\partial \pi}{\partial \theta} = -p'(\theta)(S - w - \phi\theta) - \phi(1 - p(\theta)) - p'(\theta)\eta < 0.$$

If profits are still positive for $\theta \in [\theta^* \theta^3]$, they may turn negative in the range $[\theta^3, \theta^4]$. In this range, profits are:

$$\pi = (1 - p(\theta))(S - w - \phi\theta + \chi - e) - p(\theta)\eta$$

this equals zero when

$$\pi = (1 - p(\theta))(S - w - \phi\theta + \chi - e) - p(\theta)\eta = 0$$

Rewriting gives θ^h:

$$\theta^h = \frac{S - w + \chi - e}{\phi} - \frac{p(\theta)}{(1 - p(\theta))\phi}\eta$$

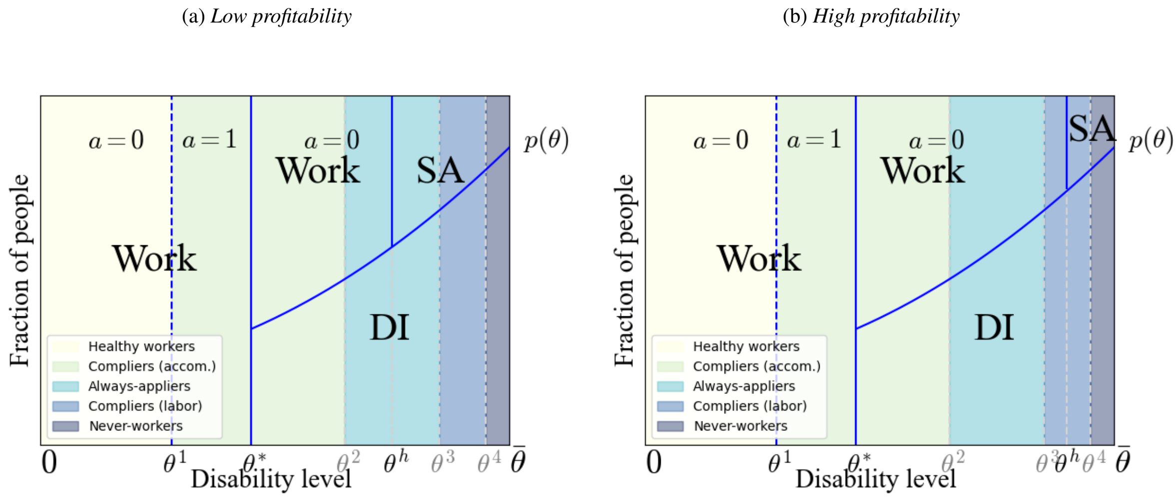
The derivative of profits with respect to θ is given by:

$$\frac{\partial \pi}{\partial \theta} = -p'(\theta)(S - w - \phi\theta + \chi - e) - (1 - p(\theta))\phi - p'(\theta)\eta < 0.$$

To summarize, for each of the two disability level ranges in which the disability level threshold above which profits become negative, θ^h, can be found by setting profits under the optimal accommodation decision in that range equal to zero. If θ^h lies in the first possible range, $[\theta^*, \theta^3]$, it is $\theta^h = \frac{S-w}{\phi} - \frac{p(\theta^h)\eta}{(1-p(\theta^h))\phi}$. In the second possible location, $[\theta^3, \theta^4]$, $\theta^h = \frac{S-w+\chi-e}{\phi} - \frac{p(\theta^h)\eta}{(1-p(\theta^h))\phi}$

The regimes are displayed in Figure 7. Beyond the hiring threshold, the other thresholds are no longer effective and a fraction $p(\theta)$ of workers receives DI, whereas a fraction $1 - p(\theta)$ relies on social assistance, as workers cannot be employed beyond the hiring threshold.

Figure 7: *Overview model with high and low profitability*



Notes: panel (a) shows the economy in the case of low profitability, i.e., the hiring threshold θ^h lies in $[\theta*, \theta^3]$, while panel (b) shows the high profitability economy, i.e., $\theta^h \in [\theta^3, \theta^4]$.

A.3 Proof of Proposition 5

The first-order condition with respect to the level of the experience rating fee η is given by Equation 5. The individual partial derivatives of this equation are the following. The partial derivative of the government budget constraint is given by:

$$\frac{\partial G(\eta, b, \theta^e)}{\partial \eta} = \tau L'(\eta) + E + \eta E'(\eta) - bDI'(\eta) - sSA'(\eta).$$

I define the number of people who are accommodated as A, which gives:

$$A = \int_{\theta^1}^{\theta^*} dF(\theta)$$

Then, the partial derivative of aggregate worker utility is:

$$\begin{aligned}\frac{\partial V_w(\eta, b, \theta^e)}{\partial \eta} &= \frac{\partial \theta^*}{\partial \eta} f(\theta^*)(u(w-\tau) - \theta^*) + \frac{\partial \theta^*}{\partial \eta} f(\theta^*) v \\ &- \frac{\partial \theta^*}{\partial \eta} f(\theta^*)(p(\theta^*)u(b) + (1-p(\theta^*))(u(w-\tau) - \theta^*)) \\ &+ \frac{\partial \theta^h}{\partial \eta} f(\theta^h)(p(\theta^h)u(b) + (1-p(\theta^h))(u(w-\tau) - \theta^h)) \\ &- \frac{\partial \theta^h}{\partial \eta} f(\theta^h)(p(\theta^h)(u(b) + (1-p(\theta^h))u(s))\end{aligned}$$

plugging in the following derivatives:

$$A'(\eta) = \frac{\partial \theta^*}{\partial \eta} f(\theta^*),$$

$$DI'(\eta) = -\frac{\partial \theta^*}{\partial \eta} f(\theta^*) p(\theta^*),$$

$$SA'(\eta) = -\frac{\partial \theta^h}{\partial \eta} f(\theta^h)(1 - p(\theta^h)),$$

I can rewrite this into:

$$\frac{\partial V_w(\eta, b, \theta^e)}{\partial \eta} = A'(\eta)v + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + SA'(\eta)[u(s) - u(w-\tau) + \theta^h].$$

I define $M(\eta) \equiv E$ as the mechanical fiscal effect of increasing η and $B(\eta) \equiv \tau L'(\eta) - bDI'(\eta) + \eta E'(\eta) - sSA'(\eta)$ as the behavioral fiscal effect, following the notation of Haller et al. (2024). Combining the partial derivatives yields:

$$\frac{A'(\eta)v + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + SA'(\eta)[u(s) - u(w-\tau) + \theta^h]}{\lambda M(\eta)} = -\left(1 + \frac{B(\eta)}{M(\eta)}\right).$$

Rewriting this gives the first-order condition for the level of the experience rating fee η in Proposition 5.

A.4 Proof of Proposition 6

The individual partial derivatives of Equation 7 are the following. The partial derivative of aggregate worker utility with respect to $-b$ is given by:

$$\frac{\partial V_w(\eta, b, \theta^e)}{\partial(-b)} = u'(-b) \cdot DI + A'(-b) \cdot v.$$

I define the mechanical fiscal effect of $-b$ as $M(-b) \equiv DI$.

The partial derivative of aggregate firm utility is given by:

$$\frac{\partial V_f}{\partial(-b)} = A'(-b)(\chi - e).$$

The partial derivative of the government budget constraint equals:

$$\frac{\partial G(\eta, b, \theta^e)}{\partial(-b)} = DI.$$

Combining the three partial derivatives yields the first-order condition:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial(-b)} = u'(-b)DI + A'(-b)v + \lambda \left[M(-b)\right] = 0,$$

which can be rewritten into Proposition 6.

A.5 Proof of Proposition 7

The individual partial derivatives of Equation 9 are the following.

I define the following terms:

$$DI'(\theta^e) = DI'_M(\theta^e) + DI'_B(\theta^e) = \int_{\theta^*}^{\bar{\theta}} \frac{\partial p(\theta, \theta^e)}{\partial \theta^e} dF(\theta) - \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) p(\theta^*),$$

in which $DI'_M(\theta^e) = \int_{\theta^*}^{\bar{\theta}} \frac{\partial p(\theta,\theta^e)}{\partial \theta^e} dF(\theta)$ and $DI'_B(\theta^e) = -\frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) p(\theta^*)$. Moreover, I define

$$SA'(\theta^e) = SA'_M(\theta^e) + SA'_B(\theta^e) = -\int_{\theta^h}^{\bar{\theta}} \frac{\partial p(\theta; \theta^e)}{\partial \theta^e} dF(\theta) - \frac{\partial \theta^h}{\partial \theta^e} f(\theta^h)(1 - p(\theta^h)),$$

with $SA'_M(\theta^e) = -\int_{\theta^h}^{\bar{\theta}} \frac{\partial p(\theta;\theta^e)}{\partial \theta^e} dF(\theta)$ and $SA'_B(\theta^e) = -\frac{\partial \theta^h}{\partial \theta^e} f(\theta^h)(1 - p(\theta^h))$. And finally, I derive

$$A'(\theta^e) = \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*).$$

Then, the partial derivative of aggregate worker utility with respect to θ^e is:

$$\begin{aligned}\frac{\partial V_w(\eta, b, \theta^e)}{\partial \theta^e} &= DI'_B(\theta^e)(u(b) - u(w - \tau) + \theta^*) + SA'_B(\theta^e)(u(s) - u(w - \tau) + \theta^h) + A'(\theta^e)v \\ &\quad + [DI'_M(\theta^e) + SA'_M(\theta^e)](u(b) - u(w - \tau) + \theta) + SA'_M(\theta^e)(u(s) - u(b).\end{aligned}$$

Note that in the fourth term, $DI'_M(\theta^e)$ encompasses both $\int_{\theta^*}^{\theta^h} \frac{\partial p(\theta)}{\partial \theta^e}$ and $\int_{\theta^h} \bar{\theta} \frac{\partial p(\theta)}{\partial \theta^e}$ (which is $-SA'_M(\theta^e)$, while for only the area between θ^* and θ^h, people switch from being on DI to working. The second area, from θ^h to $\bar{\theta}$, concerns people who switch from being on DI to receiving SA. Hence, I add the change in the number of people receiving SA to this term to only capture the first area, while the final term captures the second area.

The partial derivative of the government budget constraint is:

$$\frac{\partial G(\eta, b, \theta^e)}{\partial \theta^e} = \tau L'(\theta^e) - bDI'(\theta^e) + \eta E'(\theta^e) - sSA'(\theta^e).$$

in which

$$L'_M(\theta^e) = -\int_{\theta^*}^{\theta^h} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta),$$

$$L'_B(\theta^e) = \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) - \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*)(1 - p(\theta^*)) + \frac{\partial \theta^h}{\partial \theta^e} f(\theta^h)(1 - p(\theta^h)),$$

and $L'(\theta^e) = L'_M(\theta^e) + L'_B(\theta^e)$. Moreover, I define

$$E'_M(\theta^e) = \int_{\theta^*}^{\theta^h} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta) \text{ and } E'_B(\theta^e) = -\frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) p(\theta^*) + \frac{\partial \theta^h}{\partial \theta^e} f(\theta^h) p(\theta^h),$$

while

$$E'(\theta^e) = E'_M(\theta^e) + E'_B(\theta^e).$$

Combining the two partial derivatives (worker utility and government budget with respect to θ^e) leads to:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \theta^e} = DI'_B(\theta^e)(u(b) - u(w-\tau) + \theta^*) + SA'_B(\theta^e)(u(s) - u(w-\tau) + \theta^h) + A'(\theta^e)v$$
$$+ [DI'_M(\theta^e) + SA'_M(\theta^e)](u(b) - u(w-\tau) + \theta) + SA'_M(\theta^e)(u(s) - u(b)$$
$$+ \lambda[B(\theta^e) + M(\theta^e)] = 0,$$

when I define the following:

$$M(\theta^e) \equiv -\int_{\theta^*}^{\theta^h} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta)(b + \tau - \eta) - \int_{\theta^h}^{\bar{\theta}} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta)(b - s).$$

$$M(\theta^e) \equiv \tau L'_M(\theta^e) - bDI'_M(\theta^e) + \eta E'_M(\theta^e) - sSA'_M(\theta^e).$$

$$B(\theta^e) \equiv \tau L'_B(\theta^e) - bDI'_B(\theta^e) + \eta E'_B(\theta^e) - sSA'_B(\theta^e).$$

The first-order condition can be rewritten, showing Proposition 7.

A.6 Proof of the first-order condition with respect to accommodation in the social planner solution

a is a discrete variable, which should equal one when $V_{w,a=1} > V_{w,a=0}$.

$$V_{w,a=1} - V_{w,a=0} = \int_0^{\theta^e} (v) dF(\theta) > 0,$$

hence, a should be one in the social planner solution.

B Appendix B: Other parameterizations and boundary cases

In this Appendix, I consider other model specifications and the alternative parameterizations of the model. I start by solving the model for the high profitability regime: $\theta^h \in [\theta^3; \theta^4]$. Next, I consider the cases when the employer accommodation thresholds lie outside the employee thresholds. I also derive the case with a relatively low profitability loss caused by disability. Finally, I consider an alternative social welfare function: one that includes firm profits, equally weighted with worker utility.

B.1 High profitability economy ($\theta^h \in [\theta^3; \theta^4]$)

In the main model, I consider a low profitability economy, i.e. when the hiring threshold lies between θ^3 and θ^4. Here, I consider the case when the hiring threshold lies within θ^3 and θ^4. When $\theta^3 < \theta^h < \theta^4$, the indirect utility function and government budget constraint are:

$$\begin{aligned}
V(b,\eta) = &\int_0^{\theta^*} u(w-\tau) - \theta dF(\theta) + \int_{\theta^1}^{\theta^*} v dF(\theta) \\
&+ \int_{\theta^*}^{\theta^3} p(\theta)u(b) + (1-p(\theta))(u(w-\tau)-\theta)dF(\theta) \\
&+ \int_{\theta^3}^{\theta^h} p(\theta)u(b) + (1-p(\theta))(u(w-\tau)-\theta+v)dF(\theta) \\
&+ \int_{\theta^h}^{\bar{\theta}} p(\theta)u(b) + (1-p(\theta))u(s)dF(\theta)
\end{aligned}$$

$$\begin{aligned}
G(b,\eta) = &\tau \cdot [\int_0^{\theta^*} dF(\theta) + \int_{\theta^*}^{\theta^h} (1-p(\theta))dF(\theta)] \\
&+ \eta \cdot [\int_{\theta^*}^{\theta^h} p(\theta)dF(\theta)] - b \cdot [\int_{\theta^*}^{\bar{\theta}} p(\theta)dF(\theta)] - s\int_{\theta^h}^{\bar{\theta}} (1-p(\theta))dF(\theta).
\end{aligned}$$

This gives:

$$\frac{\partial W(b,\eta)}{\partial \eta} = \frac{\partial V(b,\eta)}{\partial \eta} + \lambda \frac{\partial G(b,\eta)}{\partial \eta}$$

$$\frac{\partial G(b,\eta)}{\partial \eta} = \tau L'(\eta) + E + \eta E'(\eta) - bDI'(\eta) - sSA'(\eta)$$

$$\frac{\partial V(b,\eta)}{\partial \eta} = SA'(\eta)[u(s) - u(w-\tau) + \theta^h] + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + A'(\eta)v$$

Combining the two derivatives gives:

$$\begin{aligned}
\frac{\partial W(b,\eta)}{\partial \eta} = &SA'(\eta)[u(s) - u(w-\tau) + \theta^h] + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + A'(\eta)v \\
&+ \lambda[\tau L'(\eta) + E + \eta E'(\eta) - bDI'(\eta) - sSA'(\eta)]
\end{aligned}$$

Setting this equal to zero gives:

$$\begin{aligned}
&SA'(\eta)[u(s) - u(w-\tau) + \theta^h] + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + A'(\eta)v \\
&= -\lambda[\tau L'(\eta) + E + \eta E'(\eta) - bDI'(\eta) - sSA'(\eta)]
\end{aligned}$$

Let's define $M(\eta) = E$ as the mechanical fiscal effect of increasing η and $B(\eta) = \tau L'(\eta) - bDI'(\eta) + \eta E'(\eta) - sSA'(\eta)$ as the behavioral fiscal effect. This gives:

$$\begin{aligned} &SA'(\eta)[u(s) - u(w-\tau) + \theta^h] + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + A'(\eta)v \\ &= -\lambda[M(\eta) + B(\eta)] \end{aligned}$$

Which gives the following optimality condition for the level of experience rating:

$$\frac{SA'(\eta)[u(s) - u(w-\tau) + \theta^h] + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + A'(\eta)v}{\lambda M(\eta)} = -\Big(1 + \frac{B(\eta)}{M(\eta)}\Big)$$

which is the same as under the low profitability regime.

The first-order condition with respect to b is given by:

$$\frac{\partial W(b,\eta)}{\partial b} = \frac{\partial V(b,\eta)}{\partial b} + \lambda \frac{\partial G(b,\eta)}{\partial b}.$$

$$\frac{\partial V(b,\eta)}{\partial b} = A'(b)v + u'(b)DI$$

$$\frac{\partial G(b,\eta)}{\partial b} = -DI$$

we define $M(b) = -DI$. Combining the two derivatives:

$$\frac{\partial W(b,\eta)}{\partial b} = A'(b)v + u'(b)DI + \lambda[M(b)] = 0$$

Rewriting gives the optimality condition for the benefit level:

$$\frac{A'(b)v + u'(b)DI}{\lambda M(b)} = -1$$

which is again the same as in the low profitability regime.

B.2 Employer threshold θ^* outside of bounds

In the main body of the text, I consider the case when the employer accommodation threshold lies strictly in between the two employee thresholds upon which it is based ($\theta^1 < \theta^* < \theta^2$). Here, I first assess the case when $\theta^1 > \theta^*$ and then the case when $\theta^* > \theta^2$.

When $\theta^1 > \theta^*$, the indirect utility function becomes:

$$\begin{aligned} V(b,\eta) = &\int_0^{\theta^1} u(w-\tau) - \theta dF(\theta) \\ &+ \int_{\theta^1}^{\theta^h} p(\theta)u(b) + (1-p(\theta))(u(w-\tau) - \theta)dF(\theta) \\ &+ \int_{\theta^h}^{\bar{\theta}} p(\theta)u(b) + (1-p(\theta))u(s)dF(\theta) \end{aligned}$$

and the government budget constraint:

$$\begin{aligned} G(b,\eta) = \tau \cdot [&\int_0^{\theta^1} dF(\theta) + \int_{\theta^1}^{\theta^h} (1-p(\theta))dF(\theta)] - b \cdot [\int_{\theta^1}^{\bar{\theta}} p(\theta)dF(\theta)] \\ &+ \eta \cdot [\int_{\theta^1}^{\theta^h} p(\theta)dF(\theta)] - s\int_{\theta^h}^{\bar{\theta}} (1-p(\theta))dF(\theta) \end{aligned}$$

$$\frac{\partial V(b,\eta)}{\partial \eta} = SA'(\eta)\cdot(u(s)-u(w-\tau)+\theta^h)$$
$$\frac{\partial G(b,\eta)}{\partial \eta} = \tau L'(\eta)+E+\eta E'(\eta)-sSA'(\eta)$$

Let's define $M(\eta) = E$ as the mechanical fiscal effect of increasing η and $B(\eta) = \tau L'(\eta) + \eta E'(\eta) - sSA'(\eta)$ as the behavioral fiscal effect. This gives:

$$\frac{\partial G(b,\eta)}{\partial \eta} = M(\eta)+B(\eta)$$

Combining the two derivatives gives:

$$\frac{\partial W(b,\eta)}{\partial \eta} = SA'(\eta)\cdot(u(s)-u(w-\tau)+\theta^h)+\lambda[M(\eta)+B(\eta)] = 0$$

Which yields the optimality condition for the level of experience rating:

$$\frac{SA'(\eta)\cdot(u(s)-u(w-\tau)+\theta^h)}{\lambda M(\eta)} = -\Big(1+\frac{B(\eta)}{M(\eta)}\Big)$$

This can be interpreted as follows. If η goes up, θ^h shifts to the left because firms find it more expensive to hire disabled workers. This means that more people will go into social assistance, who gain $u(s)$ but also lose $u(w-\tau)-\theta^h$. Compared to the main case, two terms drop out: the utility changes caused by the employer accommodation threshold shifting to the right (θ^*), resulting in more accommodation and the accompanying change in the number of people in DI because of the reduction in DI applications ($A'(\eta)$ and $DI'(\eta)$). This happens because the accommodation threshold is not effective under this parameterization; $\theta^* < \theta^1$, so all compliers with respect to accommodation will already be accommodated - so experience rating has no effect on accommodation. On the right-hand side, the total fiscal effect per mechanically saved dollar consists of reduced labor tax income, fewer people for whom experience-rated premiums are paid, but a higher per-person fee.

$$\frac{\partial V(b,\eta)}{\partial b} = DI'(b)[u(b)-u(w-\tau)+\theta^1]+u'(b)DI$$
$$\frac{\partial G(b,\eta)}{\partial b} = \tau\cdot L'(b)+\eta\cdot E'(b)-DI-b\cdot DI'(b)$$

Combining the two derivatives gives:

$$\begin{aligned}\frac{\partial W(b,\eta)}{\partial b} &= DI'(b)\cdot[u(b)-u(w-\tau)+\theta^1]\\ &\quad + u'(b)\cdot DI+\lambda\,[M(b)+B(b)]\end{aligned}$$

Setting this to zero gives:

$$DI'(b)\cdot[u(b)-u(w-\tau)+\theta^1]+u'(b)\cdot DI = -\lambda\,[M(b)+B(b)]$$

Rewriting gives the optimality condition for the benefit level b:

$$\frac{DI'(b)[u(b)-u(w-\tau)+\theta^1]+u'(b)DI}{\lambda M(b)} = -\Big(1+\frac{B(b)}{M(b)}\Big)$$

When $\theta^* > \theta^2$, the indirect utility function becomes:

$$V(b,\eta) = \int_0^{\theta^1} u(w-\tau) - \theta dF(\theta) + \int_{\theta^1}^{\theta^2} u(w-\tau) - \theta + v dF(\theta)$$
$$+ \int_{\theta^2}^{\theta^h} p(\theta)u(b) + (1-p(\theta))(u(w-\tau)-\theta) dF(\theta)$$
$$+ \int_{\theta^h}^{\bar{\theta}} p(\theta)u(b) + (1-p(\theta))u(s) dF(\theta)$$

And the government budget constraint:

$$G(b,\eta) = \tau \cdot [\int_0^{\theta^2} dF(\theta) + \int_{\theta^2}^{\theta^h} (1-p(\theta))dF(\theta)] - b \cdot [\int_{\theta^2}^{\bar{\theta}} p(\theta)dF(\theta)]$$
$$+ \eta \cdot [\int_{\theta^2}^{\theta^h} p(\theta)dF(\theta)] - s \int_{\theta^h}^{\bar{\theta}} (1-p(\theta))dF(\theta)$$

$$\frac{\partial V(b,\eta)}{\partial \eta} = SA'(\eta) \cdot (u(s) - u(w-\tau) + \theta^h)$$

$$\frac{\partial G(b,\eta)}{\partial \eta} = \tau L'(\eta) + E + \eta E'(\eta) - sSA'(\eta)$$

Let's define $M(\eta) = E$ as the mechanical fiscal effect of increasing η and $B(\eta) = \tau L'(\eta) + \eta E'(\eta) - sSA'(\eta)$ as the behavioral fiscal effect. This gives:

$$\frac{\partial G(b,\eta)}{\partial \eta} = M(\eta) + B(\eta)$$

Combining the two derivatives gives:

$$\frac{\partial W(b,\eta)}{\partial \eta} = SA'(\eta) \cdot (u(s) - u(w-\tau) + \theta^h) + \lambda[M(\eta) + B(\eta)] = 0$$

Which yields the optimality condition for the level of experience rating:

$$\frac{SA'(\eta) \cdot (u(s) - u(w-\tau) + \theta^h)}{\lambda M(\eta)} = -\Big(1 + \frac{B(\eta)}{M(\eta)}\Big)$$

Which is exactly the same as in case 2.

$$\frac{\partial V(b,\eta)}{\partial b} = DI'(b) \cdot (u(b) - u(w-\tau) + \theta^2) + u'(b) \cdot DI$$

$$\frac{\partial G(b,\eta)}{\partial b} = \tau \cdot L'(b) + \eta \cdot E'(b) - DI - b \cdot DI'(b)$$

Let's define the mechanical fiscal effect of b as $M(b) = -DI$ and the behavioral fiscal effect of b as $B(b) = \tau \cdot L'(b) + \eta \cdot E'(b) - b \cdot DI'(b)$:

$$\frac{\partial G(b,\eta)}{\partial b} = M(b) + B(b)$$

Combining the two derivatives gives:

$$\frac{\partial W(b,\eta)}{\partial b} = DI'(b) \cdot [u(b) - u(w-\tau) + \theta^2]$$
$$+ u'(b) \cdot DI + \lambda\,[M(b) + B(b)]$$

Setting this to zero gives:

$$DI'(b) \cdot \left[u(b) - u(w-\tau) + \theta^2\right] + u'(b) \cdot DI = -\lambda \left[M(b) + B(b)\right].$$

Rewriting gives the optimality condition for the benefit level b:

$$\frac{DI'(b)[u(b) - u(w-\tau) + \theta^2] + u'(b)DI}{\lambda M(b)} = -\left(1 + \frac{B(b)}{M(b)}\right)$$

This can be interpreted as follows. The left-hand side again is the total utility change per mechanically spent dollar converted to monetary terms by λ. More people go into DI because of employee moral hazard: applying to DI is more attractive. Besides, those who already were on DI, gain some utility from the increased generosity. The right-hand side concerns the total fiscal effect per mechanically spent dollar. The behavioral fiscal effect consists of the effect of decreased tax income (lower labor supply), plus increased experience rating income because of an increase in the number of people for which experience rated premiums have to be paid, plus the costs caused by more people receiving DI benefits. The mechanical effect is just the increased costs spent on DI benefits for those on DI.

B.3 Low productivity loss caused by disability, ϕ

A low ϕ does not directly affect the employee side but changes optimal employer accommodation and hiring behavior. Regarding employer accommodation, the optimal response for never-appliers is the same as this only depends on $\chi - e$. For compliers with respect to application, with disability level $\theta^1 < \theta < \theta^2$, the optimal response is different than with a high ϕ. As shown in Appendix B.3, when $\phi < \frac{p'(\theta)(S-w+\eta)}{p'(\theta)\theta+p(\theta)}$, the negative slope of $\pi_{a=1}$ with respect to θ is less steep than the slope of $\pi_{a=0}$ with respect to θ, meaning that $\pi_{a=1}$ is lower than $\pi_{a=0}$ for values of θ on $[\theta^1, \theta^*]$, and $\pi_{a=1}$ is larger than $\pi_{a=0}$ for values of θ on $[\theta^*, \theta^2]$. This implies that with a relatively low ϕ, the optimal employer accommodation decision for compliers with respect to accommodation becomes $a = 0$ for $\theta < \theta^*$ and $a = 0$ when $\theta > \theta^*$. For the other employee types (always appliers/always suppliers, compliers with respect to labor supply, and never suppliers), optimal employer accommodation does not differ from the case with relatively high ϕ.

Besides accommodation, employers choose the optimal hiring threshold. As in the main model, the firm stops hiring when expected profits turn negative. Hence, the profits at the different disability levels under the best accommodation response have to be considered. Now that right before the accommodation threshold θ^* firms will accommodate, and right after firms will not, the profit levels under optimal accommodation are as shown in table 4.

The first, third, and final ranges, are either unambiguously positive (first and third), while the final range is unambiguously negative. The three other ranges, the ranges printed in bold, are not unambiguously positive or negative.

As in the main model, the ranges where profits can turn negative are decreasing in θ, so if it turns negative in $[\theta^1, \theta^*]$, profits are also negative in $[\theta^2, \theta^3]$ and $[\theta^3, \theta^4]$ - with the exception of the range in between where accommodation is provided and profits do not turn negative ($[\theta^*, \theta^2]$). When the profits turn negative in ranges $[\theta^1, \theta^*]$ or $[\theta^2, \theta^3]$, the hiring threshold is defined as

Table 4: *Possible locations for the hiring threshold: disability level ranges and their profit levels under optimal accommodation*

Disability range	a **on range**	π
$[0, \theta^1]$	0	$S - w - \phi\theta > 0$
$[\boldsymbol{\theta^1, \theta^*}]$	**0**	$\boldsymbol{(1 - p(\theta))(S - w - \phi\theta) - p(\theta) \cdot \eta \gtreqless 0}$
$[\theta^*, \theta^2]$	1	$S - w - \phi\theta + \chi - e > 0$
$[\boldsymbol{\theta^2, \theta^3}]$	**0**	$\boldsymbol{(1 - p(\theta))(S - w - \phi\theta) - p(\theta) \cdot \eta \gtreqless 0}$
$[\boldsymbol{\theta^3, \theta^4}]$	**1**	$\boldsymbol{(1 - p(\theta))(S - w - \phi \cdot \theta + \chi - e) - p(\theta) \cdot \eta \gtreqless 0}$
$[\theta^4, \bar{\theta})]$	0	$-p(\theta)\eta < 0$

Notes: this table reports the different disability ranges, the accommodation decision of the firm at the respective range if the firm would hire, and the profit level if the firm would not. Only the second, fourth and fifth disability level ranges ($[\theta^1, \theta^*]$, $[\theta^2, \theta^3]$ and $[\theta^3, \theta^4]$) are not unambiguously positive or negative, so the hiring threshold is within one of these ranges, depending on the parameterization of the model.

$\theta^h \equiv \frac{S-w}{\phi} - \frac{p(\theta)\eta}{(1-p(\theta))\phi}$, as in the main model. When profits turn negative in $[\theta^3, \theta^4]$, the hiring threshold also is the same as in the main model: $\theta^h \equiv \frac{S-w+\chi-e}{\phi} - \frac{p(\theta)\eta}{(1-p(\theta))\phi}$. To correspond to the main model, I will continue assuming that profits turn negative in the disability range $[\theta^*, \theta^3]$, i.e., corresponding to a low profitability economy as defined earlier.

Next, the government optimization problem has to be solved. The Lagrangian is given by:

$$\max_{\eta,b,\theta^e} \mathcal{L}(\eta, b, \theta^e) = V_w(\eta, b, \theta^e) + \lambda(G(\eta, b, \theta^e) - \bar{G})$$

$$s.t.$$

$$\theta^1 = u(w - \tau) - u(b), \theta^* = \frac{\chi - e}{p(\theta)\phi} + \frac{S - w + \eta}{\phi}, \theta^2 = u(w - \tau) - u(b) + v,$$

$$\theta^h = \frac{S - w}{\phi} - \frac{p(\theta)\eta}{(1 - p(\theta))\phi}, \theta^h \in [\theta^*; \theta^3], \phi < \frac{p'(\theta)(S - w + \eta)}{p'(\theta)\theta + p(\theta)}.$$

$$V_w(\eta, b, \theta^e) = \underbrace{\int_0^{\theta^1} \big(u(w - \tau) - \theta\big) dF(\theta)}_{\text{healthy workers who all work}}$$

$$+ \underbrace{\int_{\theta^1}^{\theta^*} \big(p(\theta; \theta^e)u(b) + (1 - p(\theta; \theta^e))(u(w - \tau) - \theta)\big) dF(\theta)}_{\text{unaccommodated workers who apply to DI, a fraction } p \text{ gets DI, the other fraction works}}$$

$$+ \underbrace{\int_{\theta^*}^{\theta^2} \big(u(w - \tau) - \theta\big) dF(\theta)}_{\text{accommodated workers who work and do not apply}} + \underbrace{\int_{\theta^*}^{\theta^2} v dF(\theta)}_{\text{accommodated workers}}$$

$$+ \underbrace{\int_{\theta^2}^{\theta^h} \big(p(\theta; \theta^e)u(b) + (1 - p(\theta; \theta^e))(u(w - \tau) - \theta)\big) dF(\theta)}_{\text{workers who applied to DI, a fraction } p \text{ gets DI, the other fraction works, unaccommodated}}$$

$$+ \underbrace{\int_{\theta^h}^{\bar{\theta}} \big(p(\theta; \theta^e)u(b) + (1 - p(\theta; \theta^e)u(s)\big) dF(\theta).}_{\text{workers who applied to DI, a fraction } p \text{ gets DI, the others get social assistance}}$$

The government budget constraint is given by:

$$
\begin{aligned}
G(\eta, b, \theta^e) = \tau \cdot \Big[\int_0^{\theta^1} dF(\theta) + \int_{\theta^1}^{\theta^*} (1 - p(\theta;\theta^e))dF(\theta) + \int_{\theta^*}^{\theta^2} dF(\theta) + \int_{\theta^2}^{\theta^h} (1 - p(\theta;\theta^e))dF(\theta)\Big] \\
- b \cdot \Big[\int_{\theta^1}^{\theta^*} p(\theta;\theta^e)dF(\theta) + \int_{\theta^2}^{\bar{\theta}} p(\theta;\theta^e)dF(\theta)\Big] \\
+ \eta \cdot \Big[\int_{\theta^1}^{\theta^*} p(\theta;\theta^e)dF(\theta) + \int_{\theta^2}^{\theta^h} p(\theta;\theta^e)dF(\theta)\Big] - s \cdot \int_{\theta^h}^{\bar{\theta}} (1 - p(\theta;\theta^e))dF(\theta) \geq -\bar{G},
\end{aligned}
$$

which can also be summarized as:

$$G(\eta, b, \theta^e) = \tau L - bDI + \eta E - sSA \geq -\bar{G}.$$

The first-order condition with respect to η is given by:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \eta} = \frac{\partial V_w(\eta, b, \theta^e)}{\partial \eta} + \lambda \frac{\partial G(\eta, b, \theta^e)}{\partial \eta} = 0. \tag{12}$$

The partial derivative of V_w with respect to η is given by:

$$
\begin{aligned}
\frac{\partial V_w(\eta, b, \theta^e)}{\partial \eta} &= \frac{\partial \theta^*}{\partial \eta} f(\theta^*)(p(\theta^*)u(b) + (1 - p(\theta^*))(u(w - \tau) - \theta^*)) \\
&- \frac{\partial \theta^*}{\partial \eta} f(\theta^*)[u(w - \tau) - \theta^*] - \frac{\partial \theta^*}{\partial \eta} f(\theta^*)v \\
&+ \frac{\partial \theta^h}{\partial \eta} f(\theta^h)(p(\theta^h)u(b) + (1 - p(\theta^h))(u(w - \tau) - \theta^h)) \\
&- \frac{\partial \theta^h}{\partial \eta} f(\theta^h)(p(\theta^h)(u(b) + (1 - p(\theta^h))u(s))
\end{aligned}
$$

plugging in the following derivatives:

$$
\begin{aligned}
A'(\eta) &= -\frac{\partial \theta^*}{\partial \eta} f(\theta^*), \\
DI'(\eta) &= \frac{\partial \theta^*}{\partial \eta} f(\theta^*)p(\theta^*), \\
SA'(\eta) &= -\frac{\partial \theta^h}{\partial \eta} f(\theta^h)(1 - p(\theta^h)),
\end{aligned}
$$

gives that I can rewrite the partial derivative as:

$$\frac{\partial V_w(\eta, b, \theta^e)}{\partial \eta} = A'(\eta)v + DI'(\eta)[u(b) - u(w - \tau) + \theta^*] + SA'(\eta)[u(s) - u(w - \tau) + \theta^h].$$

This partial derivative includes the same terms as the original, yet, the signs of the effect on the number of DI applicants and on the number of people accommodated are opposite from before.

The partial derivative of G with respect to η is given by:

$$\frac{\partial G(\eta, b, \theta^e)}{\partial \eta} = \tau L'(\eta) - bDI'(\eta) + E + \eta E'(\eta) - sSA'(\eta),$$

in which $L'(\eta) = -\frac{\partial \theta^*}{\partial \eta} f(\theta^*)p(\theta^*) + \frac{\partial \theta^h}{\partial \eta} f(\theta^h)(1 - p(\theta^h))$ and $E'(\eta) = \frac{\partial \theta^*}{\partial \eta} f(\theta^*)p(\theta^*) + \frac{\partial \theta^h}{\partial \eta} f(\theta^h)p(\theta^h)$.

Combining these two partial derivatives gives the first-order condition with respect to η:

$$\frac{A'(\eta)v + DI'(\eta)[u(b) - u(w-\tau) + \theta^*] + SA'(\eta)[u(s) - u(w-\tau) + \theta^h]}{\lambda M(\eta)} = -\left(1 + \frac{B(\eta)}{M(\eta)}\right). \tag{13}$$

in which I again define $M(\eta) \equiv E$ as the mechanical fiscal effect of increasing η and $B(\eta) \equiv \tau L'(\eta) - bDI'(\eta) + \eta E'(\eta) - sSA'(\eta)$ as the behavioral fiscal effect.

The first-order condition with respect to $-b$ is given by:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial - b} = \frac{\partial V_w(\eta, b, \theta^e)}{\partial - b} + \lambda \frac{\partial G(\eta, b, \theta^e)}{\partial - b} = 0. \tag{14}$$

$$\begin{aligned}\frac{\partial V_w(\eta, b, \theta^e)}{\partial - b} &= -\frac{\partial \theta^1}{\partial - b} f(\theta^1)p(\theta^1)(u(b) - u(w-\tau) + \theta^1) \\ &- \frac{\partial \theta^2}{\partial - b} f(\theta^2)(u(b) - u(w-\tau) - \theta^2) \\ &+ \frac{\partial \theta^2}{\partial - b} f(\theta^2)v + \int_{\theta^1}^{\theta^*} p(\theta)u'(-b)dF(\theta) + \int_{\theta^2}^{\bar{\theta}} p(\theta)u'(-b)dF(\theta),\end{aligned}$$

using the following derivatives:

$$DI'(-b) = -\frac{\partial \theta^1}{\partial - b} f(\theta^1)p(\theta^1) - \frac{\partial \theta^2}{\partial - b} f(\theta^2)p(\theta^2)$$

$$A'(-b) = \frac{\partial \theta^2}{\partial - b} f(\theta^2)$$

gives:

$$\begin{aligned}\frac{\partial V_w(\eta, b, \theta^e)}{\partial b} &= -\frac{\partial \theta^1}{\partial - b} f(\theta^1)p(\theta^1)(u(b) - u(w-\tau) + \theta^1) \\ &- \frac{\partial \theta^2}{\partial - b} f(\theta^2)(u(b) - u(w-\tau) - \theta^2) \\ &+ A'(-b)v + u'(-b)DI\end{aligned}$$

The first-order condition of the government budget with respect to $-b$ is given by:

$$\frac{\partial G(\eta, b, \theta^e)}{\partial - b} = \tau L'(-b) - DI - bDI'(-b) + \eta E'(-b),$$

in which $L'(-b) = \frac{\partial \theta^1}{\partial - b} f(\theta^1)p(\theta^1) + \frac{\partial \theta^2}{\partial - b} f(\theta^2)p(\theta^2)$ and $E'(-b) = -\frac{\partial \theta^1}{\partial - b} f(\theta^1)p(\theta^1) - \frac{\partial \theta^2}{\partial - b} f(\theta^2)p(\theta^2)$. Combining these two partial derivatives yields the first-order condition:

$$\frac{-\frac{\partial \theta^1}{\partial - b} f(\theta^1)p(\theta^1)(u(b) - u(w-\tau) + \theta^1) - \frac{\partial \theta^2}{\partial - b} f(\theta^2)(u(b) - u(w-\tau) - \theta^2) + A'(-b)v + u'(-b)DI}{\lambda M(-b)}$$

$$= -\big(1 + \frac{B(-b)}{M(-b)}\big).$$

The first-order condition with respect to θ^e is given by:

$$\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \theta^e} = \frac{\partial V_w(\eta, b, \theta^e)}{\partial \theta^e} + \lambda \frac{\partial G(\eta, b, \theta^e)}{\partial \theta^e}.$$

$$
\begin{aligned}
\frac{\partial V_w(\eta,b,\theta^e)}{\partial\theta^e} &= \frac{\partial\theta^*}{\partial\theta^e} f(\theta^*)[p(\theta^*)u(b) + (1-p(\theta^*))(u(w-\tau)-\theta^*)] \\
&+ \int_{\theta^1}^{\theta^*} \frac{\partial p(\theta)}{\partial\theta^e}[u(b) - u(w-\tau) + \theta]dF(\theta) \\
&- \frac{\partial\theta^*}{\partial\theta^e} f(\theta^*)[u(w-\tau)-\theta^*] - \frac{\partial\theta^*}{\partial\theta^e} f(\theta^*)v \\
&+ \frac{\partial\theta^h}{\partial\theta^e} f(\theta^h)[p(\theta^h)u(b) + (1-p(\theta^h))(u(w-\tau)+\theta^h)] \\
&+ \int_{\theta^2}^{\theta^h} \frac{\partial p(\theta)}{\partial\theta^e}[u(b) - u(w-\tau) + \theta]dF(\theta) \\
&- \frac{\partial\theta^h}{\partial\theta^e} f(\theta^h)[p(\theta^h)u(b) + (1-p(\theta^h))u(s)] \\
&+ \int_{\theta^h}^{\bar\theta} \frac{\partial p(\theta)}{\partial\theta^e}[u(b) - u(s)]dF(\theta).
\end{aligned}
$$

I define the following terms:

$$
\begin{aligned}
DI_M'(\theta^e) &= \int_{\theta^1}^{\theta^*} \frac{\partial p(\theta^1)}{\partial\theta^e}dF(\theta) + \int_{\theta^2}^{\bar\theta} \frac{\partial p(\theta)}{\partial\theta^e}dF(\theta) \\
DI_B'(\theta^e) &= \frac{\partial\theta^*}{\partial\theta^e} f(\theta^*)p(\theta^*) \\
SA_M'(\theta^e) &= -\int_{\theta^h}^{\bar\theta} \frac{\partial p(\theta)}{\partial\theta^e}dF(\theta) \\
SA_B'(\theta^e) &= -\frac{\partial\theta^h}{\partial\theta^e} f(\theta^h)(1-p(\theta^h)) \\
A'(\theta^e) &= -\frac{\partial\theta^*}{\partial\theta^e} f(\theta^*)
\end{aligned}
$$

This gives that the partial derivative of total worker utility with respect to θ^e can be rewritten as:

$$
\begin{aligned}
\frac{\partial V_w(\eta,b,\theta^e)}{\partial\theta^e} &= DI_B'(\theta^e)(u(b) - u(w-\tau) + \theta^*) + A'(\theta^e)v \\
&+ [DI_M'(\theta^e) + SA_M'(\theta^e)](u(b) - u(w-\tau) + \theta) + SA_M'(\theta^e)(u(s) - u(b)) \\
&+ SA_B'(\theta^e)(u(s) - u(w-\tau) + \theta^h).
\end{aligned}
$$

The partial derivative of the government budget with respect to θ^e is:

$$
\frac{\partial G(\eta,b,\theta^e)}{\partial\theta^e} = \tau L'(\theta^e) - bDI'(\theta^e) + \eta E'(\theta^e) - sSA'(\theta^e),
$$

in which $L'(\theta^e) = -\frac{\partial\theta^h}{\partial\theta^e} f(\theta^*)p(\theta^*) + \frac{\partial\theta^h}{\partial\theta^e} f(\theta^h)(1-p(\theta^h))$, $DI'(\theta^e) = DI_M'(\theta^e) + DI_B'(\theta^e)$, $E'(\theta^e) = \frac{\partial\theta^*}{\partial\theta^e} f(\theta^*)p(\theta^*) + \frac{\partial\theta^h}{\partial\theta^e} f(\theta^h)p(\theta^h)$ = and $SA'(\theta^e) = SA_M'(\theta^e) + SA_B'(\theta^e)$.

Combining the partial derivatives yields the optimality condition with respect to the eligibility threshold:

$$
\begin{aligned}
\frac{\partial \mathcal{L}(\eta,b,\theta^e)}{\partial\theta^e} &= DI_B'(\theta^e)(u(b) - u(w-\tau) + \theta^*) + SA_B'(\theta^e)(u(s) - u(w-\tau) + \theta^h) + A'(\theta^e)v \\
&+ [DI_M'(\theta^e) + SA_M'(\theta^e)](u(b) - u(w-\tau) + \theta) + SA_M'(\theta^e)(u(s) - u(b) \\
&+ \lambda[B(\theta^e) + M(\theta^e)] = 0. \qquad (15)
\end{aligned}
$$

B.4 Social welfare function that includes firm profits

The optimality conditions with respect to η, $-b$ and θ^e under a social welfare function that includes firm profits are the following:

$$
\begin{aligned}
&\frac{\partial \mathcal{L}(\eta, b, \theta^e)}{\partial \eta} \gtreqless 0 \Leftrightarrow \qquad (16)\\
&\quad \frac{1}{\lambda M(\eta)}\Big(A'(\eta)(v+\chi-e) - DI'(\eta)[-u(b)+u(w-\tau)-\theta^* + (S-w-\phi\theta^*)]\\
&\quad + SA'(\eta)[u(s)-u(w-\tau)+\theta^h-(S-w-\phi\theta^h)] - E'(\eta)\eta - E\Big)\\
&\quad \gtreqless -\Big(1+\frac{B(\eta)}{M(\eta)}\Big),
\end{aligned}
$$

with $M(\eta) \equiv E = \eta$ and $B(\eta) \equiv \tau L'(\eta) - bDI'(\eta) + \eta E'(\eta) - sSA'(\eta)$.

$$
\frac{\partial \mathcal{L}}{\partial(-b)} \gtreqless 0 \Leftrightarrow \frac{u'(-b)DI + A'(-b)(v+\chi-e)}{\lambda M(-b)} \gtreqless -1, \qquad (17)
$$

with $M(-b) = DI$.

$$
\begin{aligned}
&\frac{\partial \mathcal{L}}{\partial \theta^e} \gtreqless 0 \Leftrightarrow\\
&\quad DI'_B(\theta^e)(u(b)-u(w-\tau)+\theta^*-S+w+\phi\theta^*)\\
&\quad + SA'_B(\theta^e)(u(s)-u(w-\tau)+\theta^h-S+w+\phi\theta^h)\\
&\quad + A'(\theta^e)(v+\chi-e)\\
&\quad + E'(\theta^e)[-\eta]\\
&\quad + \int_{\theta^*}^{\theta^h}\frac{\partial p(\theta;\theta^e)}{\partial\theta^e}(u(b)-u(w-\tau)+\theta-\eta-S+w+\phi\theta)dF(\theta)\\
&\quad + \int_{\theta^h}^{\bar{\theta}}\frac{\partial p(\theta;\theta^e)}{\partial\theta^e}(u(b)-u(s))dF(\theta)\\
&\quad \gtreqless \lambda[B(\theta^e)+M(\theta^e)] = 0, \qquad (18)
\end{aligned}
$$

with

$$
M(\theta^e) \equiv -(b+\tau-\eta)\int_{\theta^*}^{\theta^h}\frac{\partial p(\theta;\theta^e)}{\partial\theta^e}dF(\theta) - (b-s)\int_{\theta^h}^{\bar{\theta}}\frac{\partial p(\theta;\theta^e)}{\partial\theta^e}dF(\theta),
$$
$$
B(\theta^e) = \tau L'(\theta^e) - bDI'(\theta^e) + \eta E'(\theta^e) - sSA'(\theta^e).
$$

C Appendix C: Derivations for economy without experience rating and welfare impact of experience rating

C.1 Derivations economy without experience rating

The employee optimization problem changes when experience rating is set to zero. That is, the accommodation decision is based upon the following maximization problem, which no longer includes the experience rating fee η term:

$$\max_{a\in\{0,1\}} \pi = \begin{cases} S - w - \phi\theta + \mathbb{1}_a(\chi - e) & \theta < \theta^\gamma < \theta^l \\ (1-p(\theta))(S - w - \phi\theta + \mathbb{1}_a(\chi - e)) & \theta^\gamma < \theta < \theta^l \\ 0 & \theta^\gamma < \theta^l < \theta \end{cases}$$

$$s.t.$$

$$\theta^1 = u(w-\tau) - u(b), \theta^2 = u(w-\tau) - u(b) + v$$

$$\theta^3 = u(w-\tau) - u(s), \theta^4 = u(w-\tau) - u(s) + v.$$

Never-appliers will not be accommodated, as $\pi_{a=1} - \pi_{a=0} = \chi - e < 0$. Compliers with respect to application will be accommodated up to $\theta^* \equiv \frac{\chi - e}{p(\theta^*)\phi} + \frac{S-w}{\phi}$, as $\pi_{a=1} - \pi_{a=0} = \chi - e + p(\theta)(S - w - \phi\theta)$, when ϕ is relatively large.

Always appliers/always suppliers will not be accommodated, as $\pi_{a=1} - \pi_{a=0} = (1-p(\theta))(\chi - e) < 0$. Compliers with respect to labor supply will be accommodated, as $\pi_{a=1} - \pi_{a=0} = (1-p(\theta))(S - w - \phi\theta + \chi - e) > 0$. Never suppliers will not be accommodated, as $\pi_{a=1} - \pi_{a=0} = 0$.

Table 5: *Possible locations for the hiring threshold: disability level ranges and their profit levels under optimal accommodation*

Disability range	**a on range**	π
$[0, \theta^1]$	0	$S - w - \phi\theta > 0$
$[\theta^1, \theta^*]$	1	$S - w - \phi\theta + \chi - e > 0$
$\boldsymbol{[\theta^*, \theta^3]}$	**0**	$\boldsymbol{(1-p(\theta))(S - w - \phi\theta) > 0}$
$\boldsymbol{[\theta^3, \theta^4]}$	**1**	$\boldsymbol{(1-p(\theta))(S - w - \phi\cdot\theta + \chi - e) > 0}$
$[\theta^4, \bar{\theta})]$	0	0

As before, the firm bases its hiring decision on whether expected profits are positive under optimal firm accommodation behavior. Different from the economy with experience rating, profits cannot be negative here, because of Assumption 3 that states that profits are always positive when someone is employed. This assumption ensures that negative labor *demand* effects only occur in the model when experience rating is present. Hence, the hiring threshold coincides with θ^4: when the worker is a never-supplier and would not work, the firm decides not to hire them.

The first-order condition with respect to θ^e, in an economy without experience rating, is:

$$\begin{aligned}
\frac{\partial \mathcal{L}}{\partial \theta^e} &= \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) + \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) v \\
&- \frac{\partial \theta^*}{\partial \theta^e} f(\theta^*) \Big(p(\theta^*) u(b) + (1 - p(\theta^*))(u(w - tau) - \theta^*) \Big) \\
&+ \int_{\theta^*}^{\theta^4} \frac{\partial p(\theta)}{\partial \theta^e} (u(b) - u(w - \tau) + \theta) dF(\theta) \\
&+ \int_{\theta^4}^{\bar{\theta}} \frac{\partial p(\theta)}{\partial \theta^e} (u(b) - u(s)) dF(\theta) \\
&+ \lambda [M(\theta^e) + B(\theta^e)] = 0.
\end{aligned}$$

in which

$$M(\theta^e) \equiv - \int_{\theta^*}^{\theta^4} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta)(b + \tau - \eta) - \int_{\theta^4}^{\bar{\theta}} \frac{\partial p(\theta)}{\partial \theta^e} dF(\theta)(b - s).$$

$$\begin{aligned}
B(\theta^e) &\equiv \tau L'_B(\theta^e) - b DI'_B(\theta^e). \\
&= \frac{\partial \theta^*}{\partial \theta^e} p(\theta^*) f(\theta^*)[b + \tau].
\end{aligned}$$

Note that the behavioral effect $SA'_B(\theta^e)$ is absent. This can be rewritten as:

$$\begin{aligned}
\frac{\partial \mathcal{L}}{\partial \theta^e} &= A'(\theta^e) + DI'_B(\theta^e)(u(b) - u(w - \tau) + \theta^*) \\
&+ L'_M(\theta^e)(u(w - \tau) - \theta - u(b)) + SA'_M(\theta^e)(u(s) - u(b)) \\
&+ \lambda [M(\theta^e) + B(\theta^e)] = 0.
\end{aligned}$$

C.2 Derivation signs utility terms in welfare analysis experience rating

To derive the signs of the utility terms in the optimality condition with respect to experience rating (Proposition 5), I use the following partial derivatives: $\frac{\partial \theta^*}{\partial \eta} = \frac{1}{\phi} > 0$ and $\frac{\partial \theta^h}{\partial \eta} = - \frac{p(\theta^h)}{(1 - p(\theta^h))\phi} < 0$. Working out the partial derivatives of A, SA and DI with respect to η yields: $A'(\eta) = \frac{\partial \theta^*}{\partial \eta} f(\theta^*)$, $DI'(\eta) = - \frac{\partial \theta^*}{\partial \eta} f(\theta^*) p(\theta^*)$ and $DI'(\eta) = - \frac{\partial \theta^*}{\partial \eta} f(\theta^*) p(\theta^*)$.

Using that $\theta^* > \theta^1 = u(w - \tau) - u(b)$ and $\theta^3 < \theta^3 = u(w - \tau) - u(s)$ and using the partial derivatives above gives the signs of the utility terms.

The terms in the utility impact of experience rating have the following signs:

$$A'(\eta) v = \frac{1}{\phi} f(\theta^*) v > 0,$$

$$DI'(\eta)[u(b) - u(w - \tau) + \theta^*] = - \frac{1}{\phi} f(\theta^*) p(\theta^*)[u(b) - u(w - \tau) + \theta^*] < 0,$$

$$SA'(\eta)[u(s) - u(w - \tau) + \theta^h] = \frac{p(\theta^h)}{\phi} f(\theta^h)[u(s) - u(w - \tau) + \theta^h] < 0.$$

Moreover, the fiscal impact consists of the following terms, which are also ambiguous in sign:

$$
\begin{aligned}
&\tau L'(\eta) - bDI'(\eta) + \eta E'(\eta) - sSA'(\eta) \\
&= \tau\Big(p(\theta^*)f(\theta^*)\frac{1}{\phi} - p(\theta^h)f(\theta^h)\frac{1}{\phi}\Big) \\
&+ b\frac{1}{\phi}f(\theta^*)p(\theta^*) \\
&+ \eta\Big(- \frac{(p(\theta^h))^2}{(1-p(\theta^h))\phi}f(\theta^h) - \frac{1}{\phi}f(\theta^*)p(\theta^*)\Big) \\
&- s\big(\frac{p(\theta^h)}{\phi}f(\theta^h)\big) \\
&+ E.
\end{aligned}
$$